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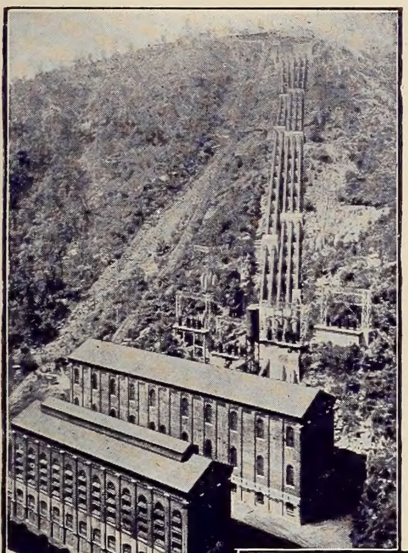
Vol. XXXI No. 13

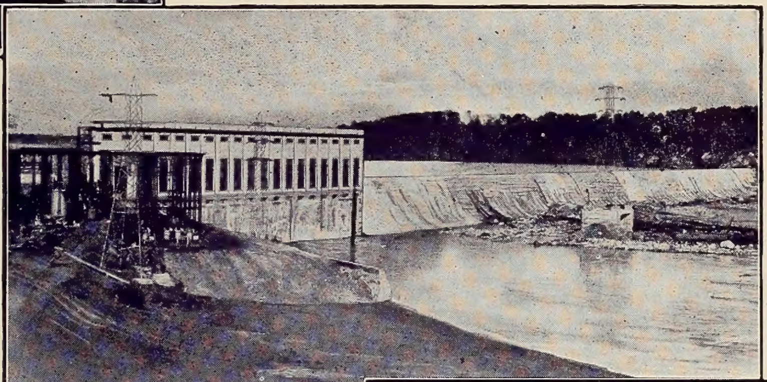
Toronto, July 1, 1922

Electrical
Engineering
Contracting
News
Merchandising
Transportation

ALMOST A HALF MILLION HORSE POWER OF SMITH HYDRAULIC TURBINES NOW IN COURSE OF CONSTRUCTION

The confidence of Canadian as well as American engineers in our equipment is well expressed by their choice of Smith Turbines for some of the most comprehensive hydro-electric developments now being carried on.

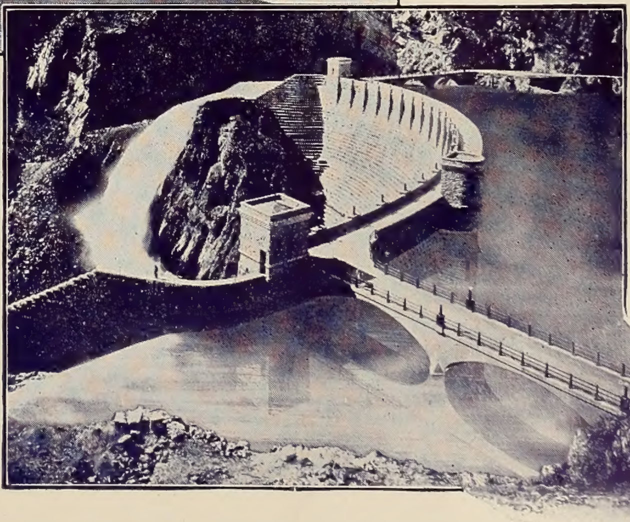




Some of the best equipped and most dependable hydraulic developments in Canada are using

SMITH
TURBINES

If interested
in the
improvement
of
water power
ask for
Bulletin "N"



Submit your power problems to our Engineering Department and get the benefit of our 40 years' experience specializing in designing and building hydraulic turbines.

S. MORGAN
SMITH CO.
YORK, Pa., U. S. A.
H. B. VAN EVERY, - Canadian Representative
465 Power Bldg., Montreal, P. Q.

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IT gives us genuine satisfaction to ally our own trade-mark with those of the well-known companies here represented.

Each trade-mark stands for a quality product that has long since established its worth wherever electrical work is done.

Complete stocks are carried at our Branch Houses.

MANUFACTURING

- Manual Telephones
- Automatic Telephones
- Wires & Cables
- Fire Alarm Systems
- Radio Sending and receiving Equipment

DISTRIBUTING

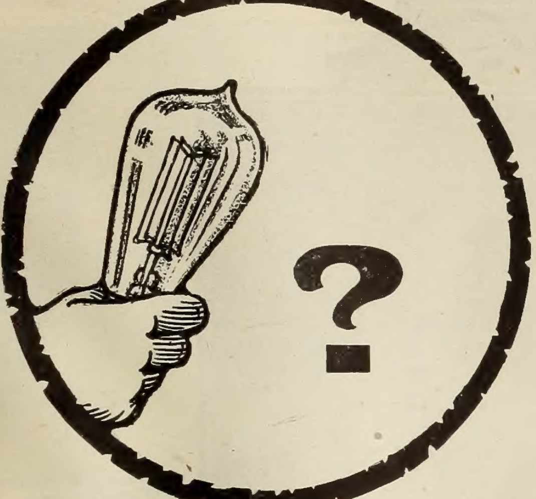
- Construction Material
- Illuminating Material
- Power Apparatus
- Household Appliances
- Electrical Supplies
- Power & Light Plants
- Marine Fittings

Northern Electric Company
LIMITED

MONTREAL	TORONTO	WINDSOR	CALGARY
HALIFAX	HAMILTON	WINNIPEG	EDMONTON
QUEBEC	LONDON	REGINA	VANCOUVER

"Makers of the Nation's Telephones"

Souvenir Lamps?



Every Electric Lamp removed from the sockets in your buildings is taken at your request.

You do not even suggest to the souvenir-hound that they are your lamps.

That isn't the worst of it—

If you can take a lamp from the corridors, wash rooms or stairways—so can the lamp collector.

Shurlok Sockets lock the lamps with a master key. You control the key and like your vault key, it protects your property.

No mystery about it. Men are naturally honest and have an instinctive respect for another's property.

A few Shurlok Sockets—where the lamps are in easy reach will do the trick.

Shurlok Sockets arouse the instinct of honesty and prevent the taking of lamps from your buildings—at your request.

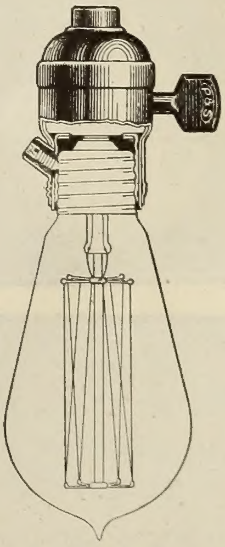
If you've never seen a Shurlok Socket—write us today.

PASS & SEYMOUR, INC.
SOLVAY, N. Y.

STANDARD ELECTRIC
P&S
WIRING DEVICES

NEW YORK BOSTON CHICAGO
PHILADELPHIA SAN FRANCISCO

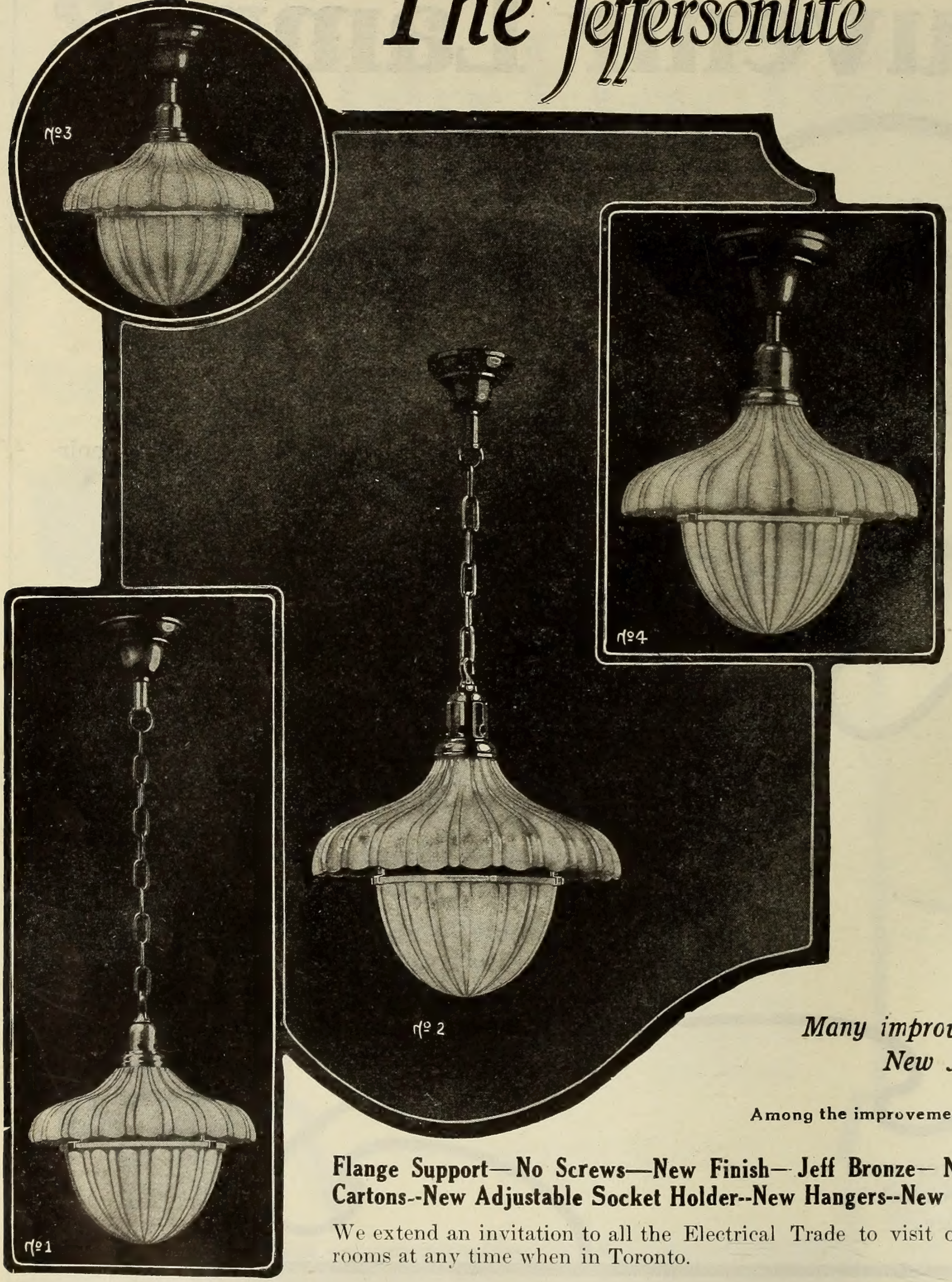
The Shurlok Key



— a "Close-up"
The Socket that Locks

MADE-IN-CANADA

The "Jeffersonlite"



Many improvements feature the New Jeffersonlite

Among the improvements are—

Flange Support—No Screws—New Finish—Jeff Bronze—New Bowl—Individual Cartons--New Adjustable Socket Holder--New Hangers--New Package--New Prices.

We extend an invitation to all the Electrical Trade to visit our Bay Street Showrooms at any time when in Toronto.

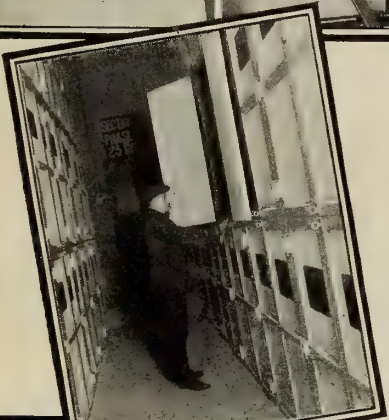
FACTORY & HEAD OFFICE
388 CARLAW AVE
TORONTO
DOWN-TOWN SHOW ROOMS
164 BAY ST., TORONTO

Jefferson Glass
MADE IN CANADA
COMPANY LIMITED

285 BEAVER HALL HILL
MONTREAL
272 MAIN STREET
WINNIPEG
510 HASTINGS ST. W.
VANCOUVER

How Transite Asbestos Wood was used at the Hell Gate Station of the United Electric Light and Power Co., N. Y.

As a flooring, Transite is light enough to lift, strong enough to walk on, and absolutely fireproof.



Doors for oil-switch cells made of Transite have given satisfactory service in many stations for years.

This Transite floor is long wearing, non-slipping, electrically safe and easily taken up when necessary.

When you need "fireproof lumber" use Transite Asbestos Wood

The all-mineral content of Transite Asbestos Wood gives the electrical industry a useful construction material, immune to fire, electric arcs, chemicals and corrosion.

Transite is strong and rigid, yet it can be readily tooled by any carpenter and fastened with screws or nails. It requires no painting or other upkeep and never warps or cracks. It is not expensive.

Every electrical engineer should be familiar with the possibilities of Transite Asbestos Wood. The list of its many uses and economies is growing daily. Send for a booklet.

CANADIAN JOHNS-MANVILLE CO. LIMITED
Toronto Montreal Winnipeg Vancouver Windsor Ottawa

Johns-Manville Service
Covers the Continent
Through
ASBESTOS
and its allied products
Electrical Materials
Brake Linings
Insulations
Roofings
Packings
Cements
Fire Prevention Products

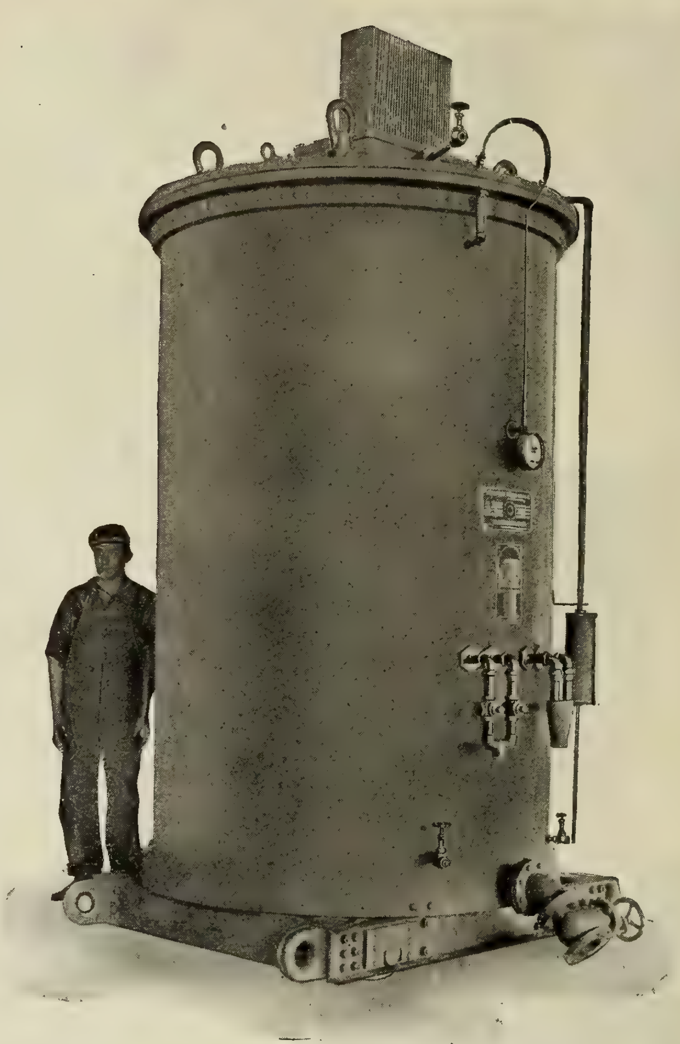
JOHNS-MANVILLE
Transite Asbestos Wood

Outstanding

Outstanding in size, were the group of six single phase Power Transformers, represented by this illustration, as built by the Canadian Crocker-Wheeler Co.

Outstanding in design, too—extra large surfaces of the windings for contact with the oil, and extra staunch bracing of the coils, being provided.

Outstanding in use, also—like all Canadian Crocker-Wheeler products—which are never sold on cut prices but on the really economical basis of delivering 100% of the service required.



4,000 K.V.A., 11,400 volts to 100/180 volts (in 5 volt steps), 25 cycles, single phase, water cooled Canadian Crocker-Wheeler Transformer.

THE CANADIAN
CROCKER-WHEELER CO.
LIMITED

Manufacturers and Electrical Engineers

Head Office and Works:
ST. CATHARINES. Ont.

District Offices:
TORONTO MONTREAL

Also all
Branches of

Northern Electric Company
LIMITED

Montreal, Halifax, Ottawa,
Toronto, London, Winnipeg,
Regina, Calgary, Vancouver.

Diamond-F

Used for Bushings,
Cleats
Commutator rings
Conduits
Fuse tubes
Insulation
Lightning Arresters
Parts for dynamos
and generators
Slot wedges
Switch bars
Switch handles

Diamond Fibre

the basis of good insulation

Diamond Fibre as a basic material is produced in three primal forms—sheets, rods and tubes. These forms are fabricated or machined into the numerous and various special parts for which Diamond Fibre is particularly adapted in the electrical trade.

Its easy workability, toughness and durability permit of its use in almost every case where good insulation is required. The chemical make-up and general character of Diamond Fibre give it a distinct superiority over other insulating materials now in general use.

Write for full technical information how Diamond Fibre can be of greatest value in your business.

Diamond State Fibre Company

of Canada Limited

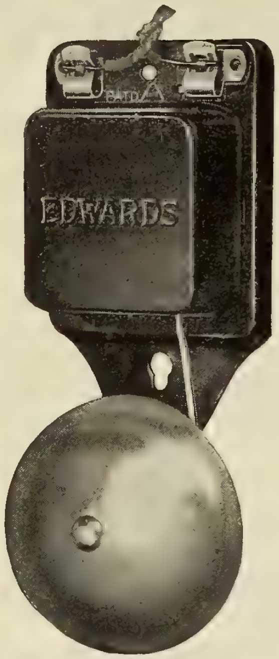
Head Office and Works: 235 Carlaw Ave., Toronto, Can.

RADIO INSULATORS

—Excellent Glaze Finish
—Packed in Corrugated Cartons
—Stands any Test
—Glazed all over making Insulation Complete
—Immediate Delivery from Stock

Macaulay Pope **186 Bay Street, Toronto**
Ade. 5318

Montreal Agents: GEO. C. ROUGH SALES CORPORATION, 134 Coristine Bldg.



Edwards Iron Box Bells and Buzzers

Now Made in Canada

These Bells and Buzzers are equipped with Fahnstock Clips which are a great improvement over the old style binding posts.

Gongs are riveted on and hammer rod is under gong where it cannot be bent or twisted.

All Bells and Buzzers carefully tested on Battery and Transformer before shipment.

Immediate shipment from Montreal stock.

Prices quoted on application.

Agents for Western Canada :
Cochrane - Stephenson & Co., Ltd. - Winnipeg, Man.

G. L. MacGillivray & Company Limited
3 St. Nicholas St., Montreal

W. H. MURDOCH
39 Duke St., Halifax

A. R. WOOLDRIDGE
220 King St. W , Toronto

Canada Wire & Cable Co. Limited

Manufacturers of

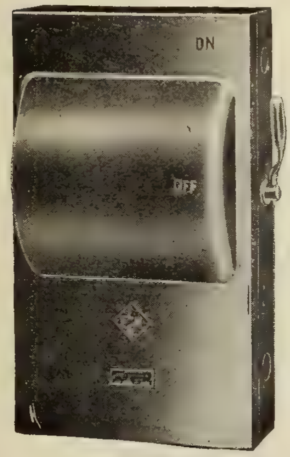
Steel Wire Rope
and
Electrical Wires and Cables

Halifax Montreal Toronto Regina
Winnipeg Calgary Vancouver

CANADA WIRE & CABLE CO.

The Lineman

"Reel Service"
From Coast to Coast



Langley

Cabinets

Cutout Boxes

and

Externally Operated Switches

Made in Winnipeg
by

Langley Electric Manufacturing Co. Ltd.
WINNIPEG MANITOBA

AICO

COLD MOLDED INSULATION
BAKELITE - CONDENSITE - ROXITE
SHELLAC COMPOSITIONS

We have a capable engineering force ready to take up your molded insulation problems.

Suggestions and estimates cheerfully given without obligation.

AMERICAN INSULATOR CORPORATION
New Freedom, Pa., U. S. A.

Represented in Canada by
G. L. MacGILLIVRAY & CO., LIMITED
3 St. Nicholas St, Montreal, P.Q.

AMPLIFY YOUR RADIO SIGNALS WITH

SUPER-SENSITIVE
Detectagraph
MICROPHONE DEVICES

Practical Instruments for Commercial & Scientific Purposes

Super-Sensitive Detectagraph Transmitter No. 2, Price $8.00 complete.

Adjusted Model No. 60 Horn, High Grade Loud Talking Receiver, Cord Plugs and Desk Stand Base, Price $15.00 complete.

Our New Special Loud Talking Receiver No. 25, Price $7.50.

Detectagraph Rheostat, especially made for amplifying circuits, Price $2.00 complete.

Write for our free descriptive new catalogue showing our complete Super-Sensitive Hearing and Talking Devices.

C. BOISSONNAULT COMPANY (inc.)
25 Church St. Factory: Whitestone, L. I. New York City

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Rubber Covered Wires and Cables

FOR POWER, LIGHT AND TELEPHONE WORK

Incandescent Lamp Cord, Flexible Switchboard Cables, Special Cords and Cables for all kinds of Electrical Work.

Prompt Shipments from Canadian Factory.

BOSTON INSULATED WIRE & CABLE CO., Limited

Canadian Office and Factory, HAMILTON, ONT.

Galvaduct

A Galvaduct Building
The Hudson Bay Stores, Victoria, B. C.

"GALVADUCT"

The most perfect interior construction conduit on the market. Recognized as the standard of high quality.

Always specify Galvaduct or Loricated CONDUITS

"LORICATED"

A high-class interior construction conduit of the enameled type, proof against acid or other corrosive agents.

If your jobber cannot supply you—write us.

CONDUITS COMPANY LIMITED
TORONTO MONTREAL
Western Sales Office: 602 Avenue Building, Winnipeg

Loricated

MODEL

THE SUN

MADE IN CANADA

Something New!

AN

ELECTRIC FLOOR WAXER AND POLISHER

The Machine You Have Waited For

To all Dealers in Electric Household Utilities

After three months of careful testing and hundreds of home demonstrations under the eye of experts, the Sun Floor Waxer and polisher is now unreservedly offered to the trade.

What Does It Do?

Scrubs floors—oiled floors, varnished floors, ordinary floors—in one quarter the time of hand work.

Waxes floors quickly, easily, perfectly.

Polishes floors, linoleum. etc., with a great saving of time and labor.

All operations with the greatest ease and without bending a knee.

Why YOU should sell this machine

It retails at an attractive price.

It yields the dealer a good profit.

It is the only electrical machine of its kind on the market.

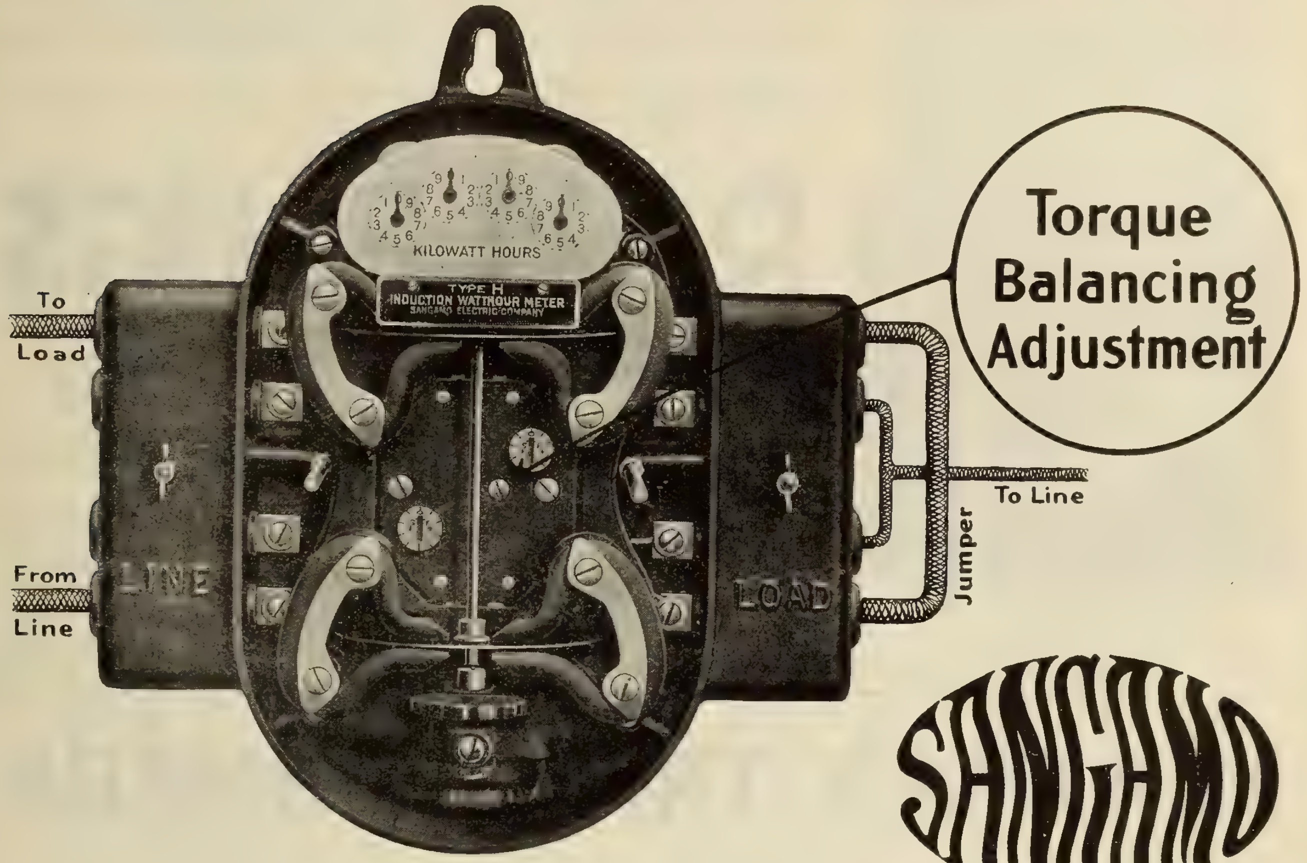
It will add to the prestige of any dealer and make him many friends.

WRITE OR WIRE FOR AGENCY TO-DAY

The
Canadian Electric Floor Waxer and Polisher Co.
Limited
TORONTO - CANADA
666A Yonge St. - Phone N. 1266

IT CLEANS · IT WAXES
THE SUN
MADE IN CANADA
IT POLISHES

Sangamo Torque Balance of Polyphase Meter



SANGAMO

Sangamo design permits an instant balance of the two elements for torque in Polyphase meters. It is only necessary to buck the elements with a "Jumper" as shown. Loosen two clamp screws of the plate and turn the torque balancing adjustment screw until disc movement ceases. This adjustment varies inversely the magnetic air gaps of the two elements until correct balance is obtained. This important adjustment, so troublesome in many types, is extremely simple and positive with Sangamo Polyphase meters.

Our nearest agent can give you many other reasons why type "H" Polyphase meters should be on your lines. Bulletin No. 5518 describes them.

Sangamo Electric Company
of Canada, Limited

2088

Factory: TORONTO **Head Sales Office:** MONTREAL

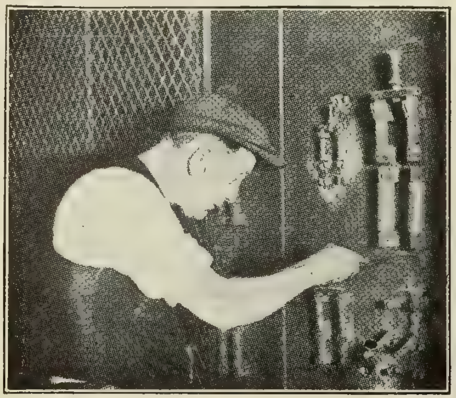
"Fix it with Rawlplugs"

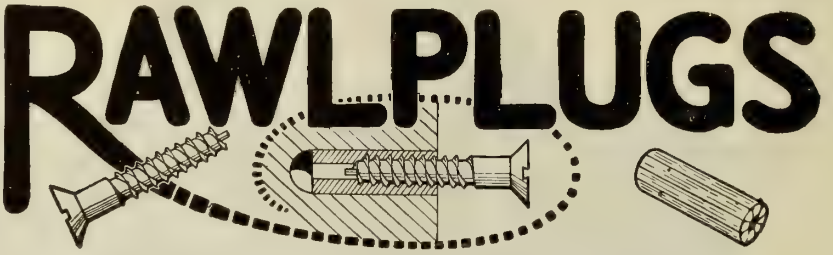
FOR SWITCHBOARD WORK

SIMPLE - ECONOMICAL - EFFICIENT - SPEEDY

The electrical man who uses Rawlplugs is bound to have a big advantage over the man who still uses the old type of Fixing Devices. In the first place, Rawlplugs cost less, hold better and require much less time to install. They require a smaller hole than other devices, screw sizes being equal. They never fracture the material and never work loose because they absorb vibration. Another feature is their light weight. Several hundred may be carried around on the job quite easily.

Used by C.P.R., Northern Electric Co., Devoe Electric Switch Co., Monarch Electric Co., Toronto Hydro Electric System, and many others. Write for samples and prices.





INVENTIONS LIMITED

Sole Agents for the Rawlplug Co. of Canada

Southam Building Bleury Street Montreal

Sales Agents for Ontario: Dominion Engineering Agency, Limited, 24 Adelaide St., East, Toronto. Stocks carried by: Rice Lewis Co., Toronto; Factory Products, Ltd., Toronto.

The Rawlplug Company, 461 Eighth Ave., New York City.

MOLONEY TRANSFORMERS

RELIABLE AND EFFICIENT

Reliability under the severest conditions has always been one of the most desirable features of MOLONEY Transformers. That they are also efficient and give long service is proved by their ever increasing use from coast to coast. Let us send you full particulars.

MADE IN CANADA

MOLONEY ELECTRIC COMPANY OF CANADA, LIMITED

Agents:
Frank Darling & Co., Ltd., Vancouver. General Supplies Ltd., Calgary.

District Offices
Montreal, Halifax
and Winnipeg

Factory
Windsor, Ont.

Head Sales Office
501 York Bldg., King & York Sts.,
Toronto

Polyphase Meters

Type "C"—Bottom Terminals

We have a large stock of these meters which can be supplied with either clock or cyclometer type of dial, and in six terminal or seven terminal styles. The shunt leads are brought out to a separate terminal in the "Seven Terminal" meter, which isolates the Line Voltage from the current coils, thereby reducing chance of short-circuits between coils and coils and case.

Write for Special Prices on this stock.

Ferranti Meter and Transformer Mfg. Co. Ltd.

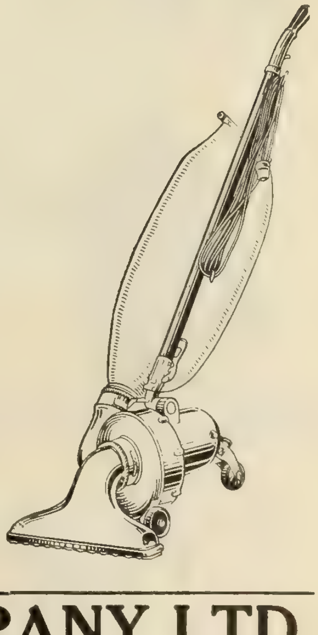
26 Noble St. TORONTO
128 Bleury St. MONTREAL
Simpson Bldg. HALIFAX
145 Market Ave. WINNIPEG
Northwestern Engineering & Supply Co. CALGARY
Northern Ontario J. P. Bartleman Timmins

"UNIVERSAL"

THE nozzle of the "Universal" is narrow at the centre and wide at the ends to equalize the volume and velocity of air throughout the entire length. Thread, lint, hair and other clinging fibrous matter is dislodged by a series of smooth, blunt thread catchers permanently attached to the lips of the nozzle and drawn into the bag by the powerful suction.

The "Universal" hinged terminal does away with wear, strain and breakage of flexible cords between the motor binding posts and the operating handle. The hinged joint connects the handle securely to the motor housing and provides a multiplicity of paths through which the current flows. Spring tension is exerted in the highest terminal to insure perfect contact and compensate for wear.

The large, powerful "Universal" Motor, 10,000 R.P.M. is developed and built especially for this cleaner in accordance with our own design and specifications. Of standard manufacture and fully guaranteed.



GREAT WEST ELECTRIC COMPANY LTD.

61-65 ALBERT ST. - WINNIPEG, MAN.

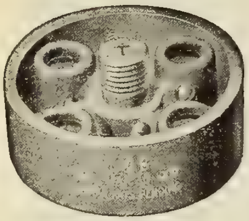
FITTINGS

for the Efficient and Economical Installation of

TRICABLE

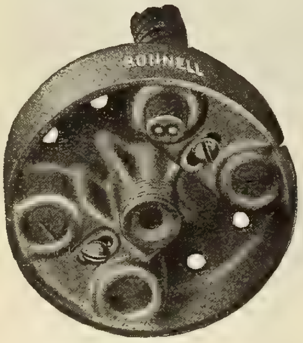
(Underwriters Approved)

Flexible Steel Armoured Conductors



Straight Electric Tricable Outlet Box.

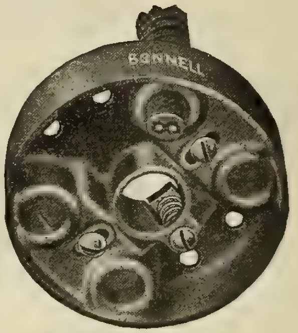
Combination Gas and Electric Tricable Outlet Box



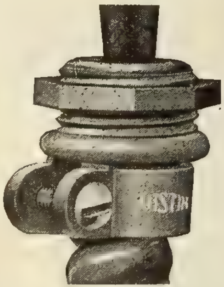
Straight Electric Tricable Outlet Box.

TRICABLE reduces your installation costs, used in conjunction with Standard Outlet Boxes and Box Connectors, saving both labor and material.

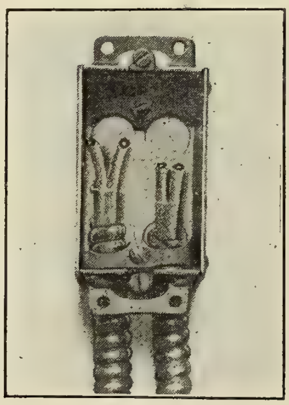
Cable Outlet and Switch Boxes as illustrated herewith further reduce the cost of better wiring.



Combination Gas and Electric Tricable Outlet Box



Straight Box Connector used with Standard Outlet Box.



Switch Box Complete with Clamps
These boxes can be built up to accommodate 10 switches and receptacles.

Angle Box Connector Used with Standard Outlet Box

TRICABLE AND FITTINGS

Are carried by all good jobbers

Packard

Look—Something New

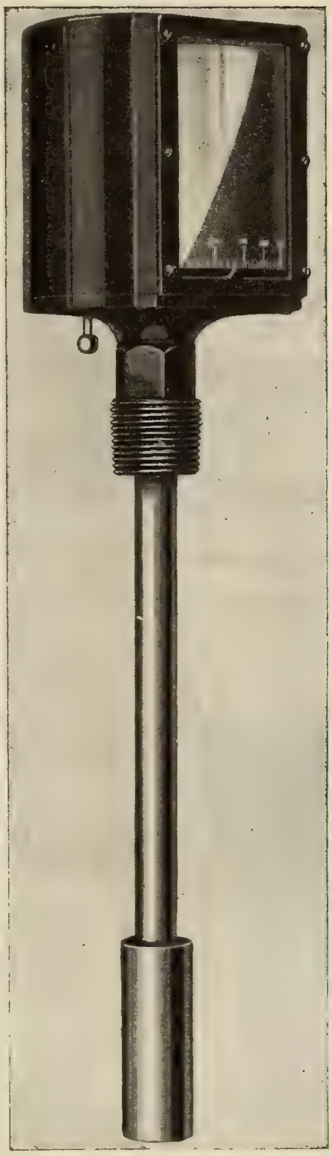
Transformer Temperature Signal

Registers Maximum Temperature

Saves all burn-outs. Shows percentage of load on transformers at all times, thereby indicating when lines may be re-adjusted so as to load transformers to better advantage.

Canadian and U. S. Patents Pending

See Our Nearest Representative



For Every Service Type Transformer

White Signal Shows Dangerous Temperature

Can be seen from the street — simple and durable — worth a great many times its cost in the transformers it will save. It is the enemy of the repair man.

Others may follow but we lead

The Packard Electric Co., Limited

St. Catharines, Ontario

Room 308-9, 7 Adelaide St. W., Toronto
421 Power Building, Montreal
703 Confederation Life Building, Winnipeg

Agents:
Eastern Electric Co., Limited, St. John, N.B.
J. T. Warren, 738-11th St. West, Calgary, Alta.
W H. Hazlitt & Co., Ltd., Room 401 Northwest Bldg., Vancouver, B. C.
John Starr, Son & Co., Limited, Halifax, N.S.

SELL ON TIME FOR CASH

Realizing that the only factor that is limiting the dealer's sales of "BLUEBIRD" washing machines, and keeping him from developing this profitable line of business to the full extent of the market is the inability of the average housewife to pay cash for her machine,

THE "BLUEBIRD" CORPORATION LIMITED, BRANTFORD, ONT., is now prepared to finance the time sales of "BLUEBIRD" Washing Machines for all dealers of good credit rating without expense to the dealer, assuring him the full cash price of the machine when the sale is made.

THE "BLUEBIRD" PLAN:—
Brings to every dealer the unlimited capital and resources to offer time payments freely and gladly to every woman in his community of good credit standing.

Gives the dealer's customers the full advantages of time payments while affording the dealer the full advantage of a cash transaction.

WRITE AT ONCE FOR DETAILS OF THIS IMPORTANT "BLUEBIRD" DEVELOPMENT

Holtzer-Cabot

Signal Systems for Hospitals

Nurses' Call
"In" and "Out"
Watchman's Report
Doctors' Call
Fire Alarm
Telephone

Mr. Contractor:— Every new hospital and many existing hospitals are prospects for one or more of these efficient, essential labor saving and protective signal systems.

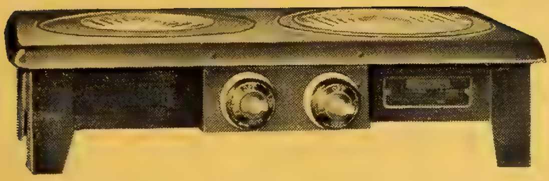
Send for our new 42 page brochure, giving complete description, layout, wiring diagrams, etc.

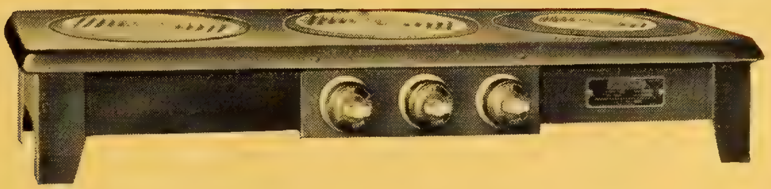
The Holtzer-Cabot Electric Company

BOSTON
BALTIMORE
CHICAGO
PHILADELPHIA
CLEVELAND
NEW YORK
SAN FRANCISCO

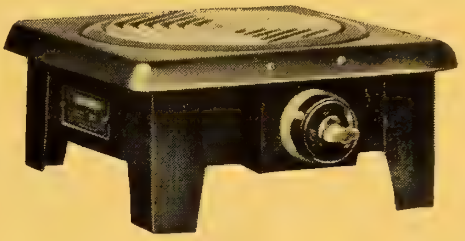
S-148

The New Hotpoint





Hot Plates



THERE is a market for Hotplates worth going after. Electrical convenience is the topic of conversation in thousands of homes to-day. There are many people who cannot afford, or do not require, a complete electrical range. But, these people are still entitled to the comfort and convenience of electric cooking.

In order to supply this demand, we have recently put into production a new line of Hotplates. Made in three sizes —1, 2 and 3 units, these devices are light in weight, rigid in construction, and remarkably efficient. Finished in all black japan, they are very easy to keep clean. The units, which are of the standard range type, are controlled by, separate, three heat switches.

Hotpoint Iron Campaign

Thursday, July 13th, is the day this Campaign will commence. We strongly urge you to check over your stock, and make sure that you have an adequate supply of Hotpoint Irons on hand.

"Made in Canada"

Canadian Edison Appliance Co., Limited
STRATFORD, ONTARIO.

Not even hands are required to operate the NEW C·G·E TUMBLER SWITCH

HERE'S a switch that responds to the sweep of a hand across the wall—no fumbling around to find the right button. The C.G.E. Tumbler Switch works like a lever, up and down, at the lightest touch. When hands are full, an elbow answers the purpose. And yet this simple device is so sturdy and reliable, that it never gets out of order.

C.G.E. Tumbler Switches are made in three styles. The flush type—applicable to every kind of residence, is finished with a black moulded handle, and has a very handsome appearance. The surface type is small compact and unobtrusive in appearance. The all porcelain model, which is also of the surface type, is for use in damp places.

The fact, that the button is in one position for "off" and in another for "on" makes the C.G.E. Tumbler Switch self-indicating.

"Made in Canada"

Canadian General Electric Co., Limited

HEAD OFFICE TORONTO

Branch Offices: Halifax, Sydney, St. John, Montreal, Quebec, Cobalt, Ottawa, Hamilton, London, Windsor, South Porcupine, Winnipeg, Calgary, Edmonton, Vancouver, Nelson and Victoria.

The Eden

All Parts Enclosed—Absolutely Safe

WRINGER CONTROL
SIMPLY PUSH LEVER TO OPERATE WRINGER. BOTH WRINGER AND WASHER OPERATE AT SAME TIME, OR SEPARATELY.

WRINGER LOCK LEVER
THIS INTERLOCKING LEVER HOLDS WRINGER IN ANY OF 5 POSITIONS WHILE WRINGING, AND THE SAFETY INTERLOCKING DEVICE PREVENTS WRINGER OPERATION UNTIL IT IS SECURELY LOCKED INTO POSITION.

SELF-LUBRICATING
THESE UNITS HAVE NO OIL HOLES. THEY ARE PACKED WITH A LONG-LIFE NON-FLUID GREASE. THE EDEN IS SELF-OILING.

AUTOMATIC START AND STOP
THE WASHER STARTING LEVER WORKS AUTOMATICALLY—SIMPLY PULL THIS LITTLE WING TO START, AND RELEASE TO STOP CYLINDER. DOORS ALWAYS STOP ON TOP READY TO OPEN. THIS UNIT CONTROLS THE REVERSING OF THE CYLINDER EVERY SIX REVOLUTIONS.

WATER LINE WINDOW
WATER LEVEL VISIBLE AT A GLANCE. A VERY CONVENIENT FEATURE.

ALL MOVING PARTS ENCLOSED
EVERY WORKING PART IS COVERED. THE EDEN IS PERFECTLY SAFE WHERE THERE ARE CHILDREN PLAYING ABOUT. CLOTHING CANNOT BECOME ENTANGLED.

SELF-DRAINING
BECAUSE OF THE DEEP DRAIN CHANNEL AND LOCATION OF DRAIN COCK, MACHINE IS SELF-DRAINING AND DOES NOT NEED TIPPING. OPEN DRAIN, CANNOT CLOG.

SWINGING WRINGER
RIGID, SELF-SUPPORTING, ELECTRICALLY OPERATED WRINGER. CAN'T SAG. SWINGS IN COMPLETE CIRCLE AND HAS 5 LOCKING POSITIONS. FULL 12-INCH WRINGER ROLLS WITH EXTENSION DRIP PAN AND SAFETY RELEASE.

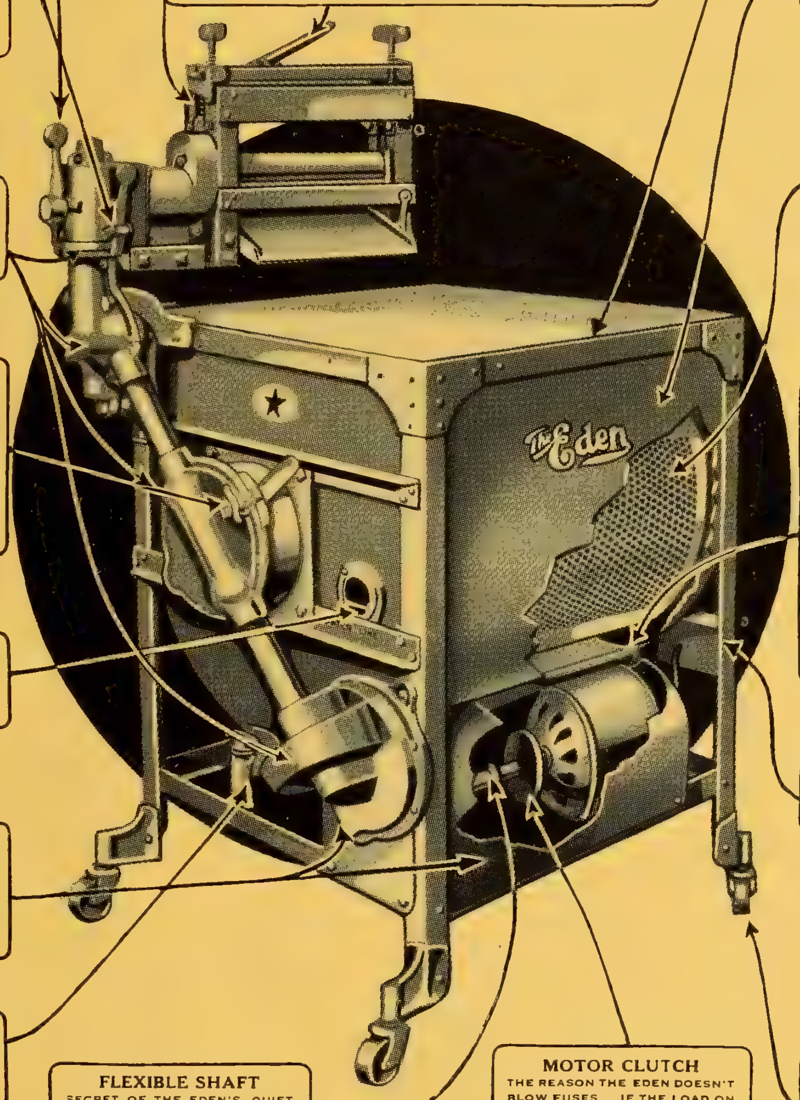


TABLE TOP COVER
SMOOTH, STRONG COVER CRIMPED — MAKES TOP OF MACHINE AS HANDY AS A TABLE

THE EDEN TUB
TUB IS MADE IN HEAVY COPPER OR ARMCO GALVANIZED IRON. EITHER MATERIAL LASTS A LIFETIME.

SANITARY ZINC CYLINDER
HAS THOUSANDS OF SMALL, SMOOTH HOLES. WEIGHS BUT 18 LBS. WET OR DRY. EASY TO LIFT OUT. WILL NOT WARP, GET WATER-SOAKED OR RUST.

SEDIMENT ZONE
(Exclusive Feature)
THE SEDIMENT ZONE—A CHANNEL OF QUIET WATER AT THE BOTTOM OF THE EDEN TUB—TRAPS ALL DIRT AS IT FALLS THROUGH THE PERFORATED WASHING CYLINDER, KEEPING THE WASH WATER ENTIRELY FREE FROM ALL THOSE DIRT-PARTICLES WHICH MAR THE SPOTLESSNESS OF CLOTHES WHEN PERMITTED TO MINGLE THROUGH THEM. THIS CONTINUOUS DIRT ELIMINATION IS WHAT MAKES EDEN-WASHED THINGS CLEANER.

INSULATING BLOCK
WITH DETACHABLE PLUG.

FLEXIBLE SHAFT
SECRET OF THE EDEN'S QUIET OPERATION. THIS SHAFT ELIMINATES VIBRATION AND INSULATES THE MECHANISM.

MOTOR CLUTCH
THE REASON THE EDEN DOESN'T BLOW FUSES. IF THE LOAD ON MOTOR BECOMES TOO GREAT THE CLUTCH RELEASES AUTOMATICALLY AND MOTOR RUNS FREE.

EXTRA LARGE ROLL SWIVEL CASTERS
HEAVILY GALVANIZED TO PREVENT RUSTING. MAKES MACHINE ROLL VERY EASY.

Eden Washing Machines are equipped with C. G. E. Motors.

Our nearest sales branch will be pleased to supply complete information regarding this machine.

Canadian General Electric Co., Limited

HEAD OFFICE TORONTO

Branch Offices: Halifax, Sydney, St. John, Montreal, Quebec, Cobalt, Ottawa, Hamilton, London, Windsor, South Porcupine, Winnipeg, Calgary, Edmonton, Vancouver, Nelson and Victoria.

C.G.E. Ornamental Lighting
WESTMOUNT, P.Q.

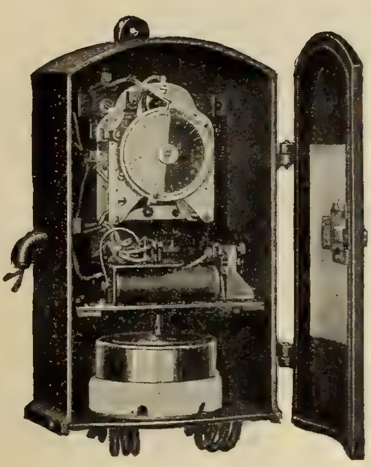
To obtain one hundred per cent. satisfaction from a street lighting installation it is essential that it should harmonize with the district. To achieve this result in the residential section of Westmount, P. Q., it was decided to use C.G.E. eight panel globes. As will be seen from the photograph, the unit has a very handsome appearance, and was especially chosen to be in keeping with the neighborhood.

Each unit is equipped with dome refractors and porcelain enamelled reflectors with stippled glass panels. The system is fed from C.G.E. station type Constant Current Transformers. The secondary current of 6.6 amperes is stepped up to 20 amperes by transformers in the casting of each unit, thereby, affording the use of the 20 ampere high efficiency Mazda Lamp. The units are spaced in staggered arrangement.

Canadian General Electric Co., Limited
HEAD OFFICE TORONTO

Branch Offices: Halifax, Sydney, St. John, Montreal, Quebec, Cobalt, Ottawa, Hamilton, London, Windsor, South Porcupine, Winnipeg, Calgary, Edmonton, Vancouver, Nelson and Victoria.

Self-Winding Time Switch



Every owner of a key-wound time switch will want a Self-Winding Time Switch when he realizes the superiority of this type. This is true because it does away with the big drawback of all key-wound switches—the need of someone to wind the clock. The value of such switches depends entirely on their being wound regularly by someone—it is very human to forget.

The time-keeping and the switch trip device units are encased in a dust, weather and vapor-proof heavy cast-iron case, neatly finished. The cover has a heavy rubber gasket, making the cabinet absolutely water tight. This switch can be operated on a transformer or on six dry cells.

The Devoe Electric Switch Company

414 Notre Dame St., West,
MONTREAL

105 Victoria Street,
TORONTO

XCELADUCT

GALVANIZED

Approved by the Hydro-Electric Commission of Ontario
Labelled under supervision of Underwriters' Laboratories

Made in Canada Conduit

Electrical Wiring Made Safe

For All Electrical Installations

Manufactured by
National Conduit Co., Limited
Toronto

Sales Agents for Manitoba and Saskatchewan—Filer-Smith Machinery Co., Limited, Winnipeg.

RADIO

We carry stock in Montreal for Radio Dealers

CRYSTAL SETS (The Famous Premier Junior)	RECEIVING TUBE SETS
TWO STEP AMPLIFIERS	RHEOSTATS
DIALS	CONDENSERS
TRANSFORMERS	SOCKETS
HEAD SETS	ETC.

Write to us for prices on any radio parts or sets in which you are interested for immediate or later delivery

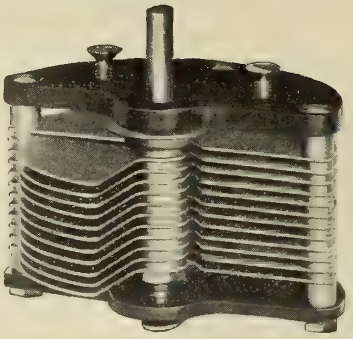
J. A. ANDERSON & CO.

205 Mansfield St., Montreal

Agents for

PREMIER RADIO CORPORATION OF AMERICA
78 Fifth Ave., New York, N. Y.
DICTOGRAPH PRODUCTS CORPORATION OF AMERICA
New York - - - N. Y.

Variable Condensers



Variable condensers to be efficient must be well made. Loose joints or faulty construction soon allows the plates to get out of alignment and decreases their efficiency.

A seasoned organization backed by a half million dollar equipment have placed the United Condensers in the front rank with radio engineers the country over.

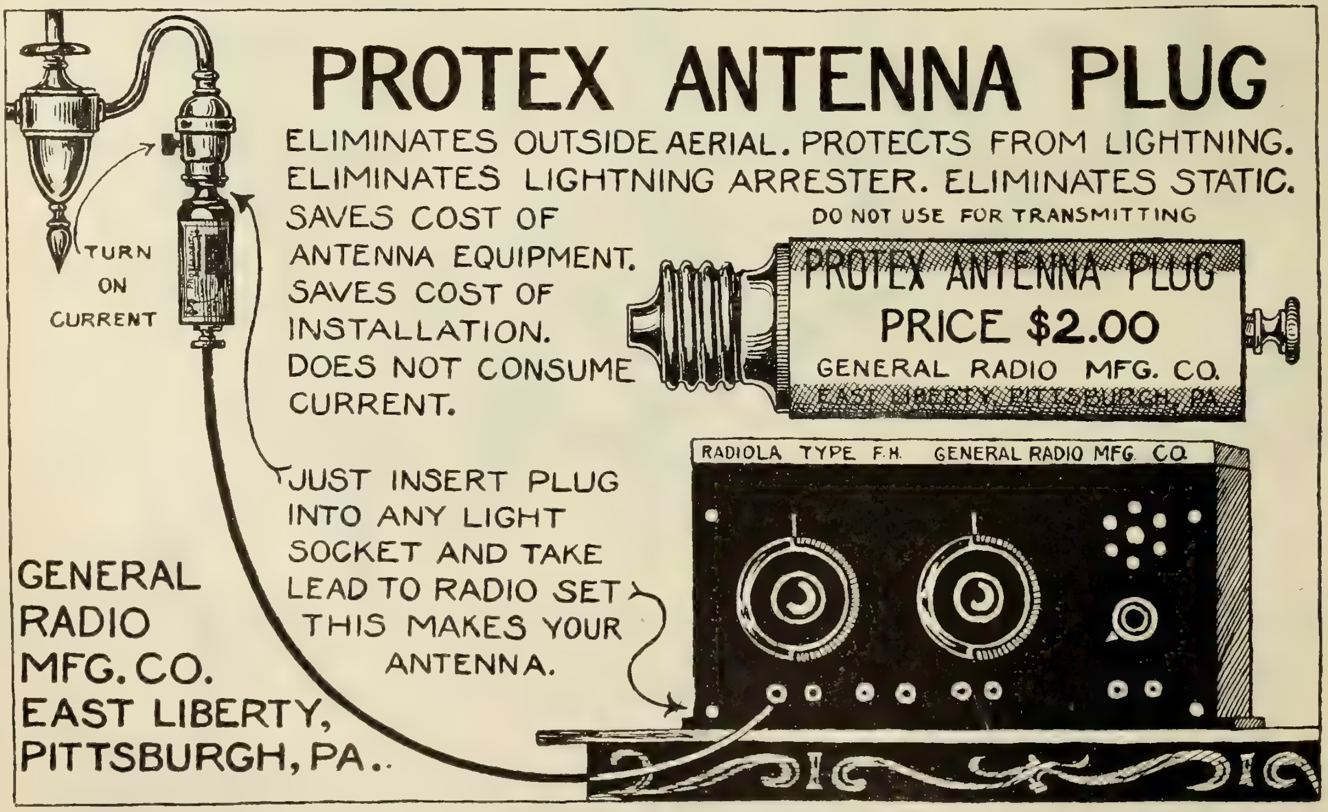
Prices	43 Plate	$4.50
	23 "	4.30
	11 "	4.00

without dial or knob.

Liberal discounts to jobbers and dealers.
We invite correspondence with Radio Manufacturers who are interested in using our facilities and services for manufacturing Radio Equipment.

United Mfg. and Distributing Co.
536 Lake Shore Drive, Chicago, Ill.

Danger of Lightning-Fire eliminated in Radio by using

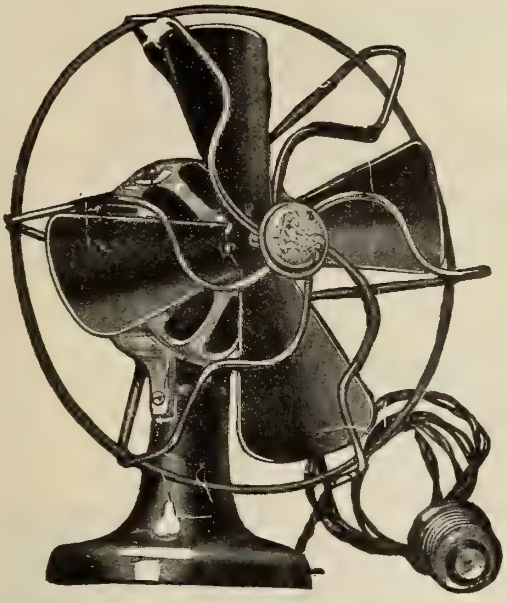

TURN ON CURRENT
DO NOT USE FOR TRANSMITTING
PROTEX ANTENNA PLUG
PRICE $2.00
GENERAL RADIO MFG. CO.
EAST LIBERTY PITTSBURGH, PA.
RADIOLA TYPE F.H. GENERAL RADIO MFG. CO.

PROTEX ANTENNA PLUG

ELIMINATES OUTSIDE AERIAL. PROTECTS FROM LIGHTNING.
ELIMINATES LIGHTNING ARRESTER. ELIMINATES STATIC.
SAVES COST OF ANTENNA EQUIPMENT.
SAVES COST OF INSTALLATION.
DOES NOT CONSUME CURRENT.

JUST INSERT PLUG INTO ANY LIGHT SOCKET AND TAKE LEAD TO RADIO SET THIS MAKES YOUR ANTENNA.

GENERAL
RADIO
MFG. CO.
EAST LIBERTY,
PITTSBURGH, PA..



Polar Cub

Electric Fans

6 inch size (1 speed) Fan retails - $ 7.50
8 " " 1 " " " - $11.25

'Make hay while the sun shines' by offering this business getter to your customers at the right time. The demand is sharp; be ready for the sales.

Highly Buffed Solid Brass Blades, Reservoir Oiling System, New Guards, Improved Motor.

Write or wire your requirements.

The A. C. Gilbert - Menzies Co., Limited 439 King Street W.
TORONTO

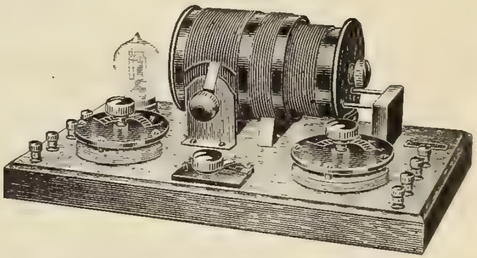
Manufacturers of Gilbert Toys. **Agents Gilbert's Polar Club Fans and Electrical Specialties.**

RADIO

Ready for delivery Now

4016 Mineral Receiving Set, complete with Head Phones. Retail $22.50. Ready for delivery NOW. Receiving range 15 to 25 miles.

Gilbert Head Phones 2000 Ohm. Retail $9.75. This set tests as high as sets selling at twice as much. Immediate delivery.



4018 Audion straight wired receiving set, range 100 to 150 miles. Retail price without Bulbs Batteries or Phones, $37.50.
Orders being booked for immediate delivery.

One, two and three stage amplifiers, Loud Speakers, Amplifying Transformers, Crystals, Variable Condensers, Lightning Arrestors.

Also straight wired long distance receiving sets.

Prices on application—send for catalogue.

The A. C. Gilbert - Menzies Co., Limited 439 King St. W
TORONTO

Manufacturers of Gilbert Toys. **Agents Gilbert's Polar Cub Fans and Electrical Specialties**

Made in Canada

Retail Price $\$5^{00}$

A good margin of profit for the Dealer and Jobber.

Entirely made, not assembled, in our own factory.

Attractively packed, an ideal shelf stock.

"Levolier" Lever socket of new design far superior to old type previously used.

W. H. Banfield & Sons Limited

370-386 Pape Avenue - - - - TORONTO

THE L. and N. COMPANY Limited

ST. JOHNS, Que.

MANUFACTURERS OF FLEXIBLE CONDUIT AND KRAFT PAPER CORD

LOOMDUCT

A Single Wall Conduit of Unusual Flexibility.

Every coil of "Loomduct" and "Insuladuct" is fished at the factory and guaranteed against defects of every kind.

INSULADUCT

A Double Wall Conduit of Great Strength and Durability.

TRADE MARK Loomduct REGISTERED

APPROVED BY THE BOARD OF FIRE UNDERWRITERS : :

TRADE MARK Insuladuct REGISTERED

THE FOLLOWING SIZES ALWAYS IN STOCK :— ¼" ⅜" ½" ⅝" ¾" 1"

AN occasional cleaning and oiling is about all of the attention required by the motors in plants which are R & M equipped. Their liberally proportioned, dust-proof, accurately fitted bearings, sturdy frames and low temperature ratings keep them on the job year after year, in times of forced production and heavy overloads as well as under normal operating conditions.

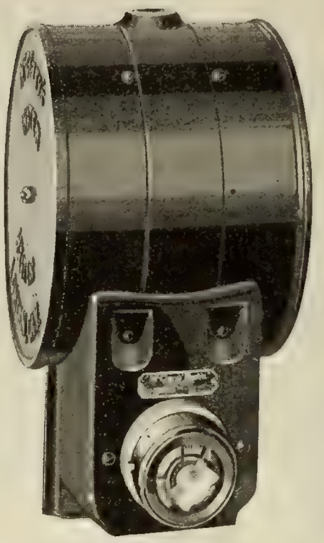
Whatever the demand may be, the factory engineer and plant electrician know their R & M motors will meet the demand. That is why those who have had experience with these motors speak for R & M when new motors are needed.

Distributors and dealers find this attitude of the factory men a big help when selling R & M motors to industrial users. Power companies too, find the enthusiasm of such customers a help when converting other power users to electric drive.

The Robbins & Myers Company of Canada, Limited

Brantford Ontario

Robbins & Myers Motors



McClary's

New

Electric Water Heater

Destined to be one of the outstanding successes of McCLARY'S line. The success of any single electrical unit helps the electrical trade as a whole and McCLARY'S new Electric Water Heater will be a wonderful outstanding factor in the world of labor saving appliances.

This Heater is a simple contrivance compared to Heaters previously marketed, and any Electrician can make any necessary adjustments and replacements that become necessary from time to time. To remove Elements, all that is neceessary to do is to unscrew a single bolt and the cast iron casing can be removed. Standard Elements are used on the heating units and any Electrical disturbances can be immediately adjusted, that is, outside of actual replacements. This new heater is a neat, well constructed contrivance, and can be installed with the absolute minimum of trouble. There are three sizes—110 volts, 220 volts and 110-220 volts, and their heating abilities are guaranteed to be equal to all recognized requirements. Consumers are waiting for the arrival of such a heater as this and good profitable business is assured to the dealer who is ready to supply the demand.

The Coils, Bushings, Wiring etc., are all of the highest grade material, carefully selected and tested. Workmanship and technic are of the very finest.

This Water Heater is now ready for shipment. Send us your orders.

McClary's

London Toronto Montreal Winnipeg Vancouver St. John, N.B.
Hamilton Calgary Saskatoon Edmonton

Electrical News
Generation, Transmission and Application of Electricity

For nearly thirty years the recognized journal for the Electrical Interests of Canada.

Published Semi-Monthly By
HUGH C. MACLEAN PUBLICATIONS
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THOMAS S. YOUNG, Toronto, Managing Director
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HEAD OFFICE - 347 Adelaide Street West, TORONTO
Telephone A. 2700

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CHICAGO - - 14 West Washington St.
LONDON, ENG. - - 16 Regent Street S.W.

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Orders for advertising should reach the office of publication not later than the 5th and 20th of the month. Changes in advertisements will be made whenever desired, without cost to the advertiser.

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Vol. 31 *Toronto, July 1, 1922* *No. 13*

Canadian Contractors and Dealers Getting Together

Contractor dealers of the Province of Ontario have discussed at considerable length the advisability of holding a convention in the near future, and at the last meeting of the Executive it was decided to take the plunge, and the convention will be held on November 13th and 14th in Toronto.

Though the moving spirit in this matter is the Ontario Association of Electrical Contractors and Dealers, it is hoped that the convention, in fact, will be Dominion wide. It is high time we had the contractors and dealers of the various provinces tied in together in some way, and while it may not be advisable to form a Dominion organization en masse, still a convention composed of contractor-dealers from all over Canada may be the best means of initiating a workable Dominion organization.

The scheme of organization that seems to appeal to the majority and which has more merit, we believe, than any other scheme, is one which would be based on lines similar to those along which the Ontario Association itself is being gradually built up. The scheme in Ontario has been to form local groups covering only such areas as admit of the frequent meeting of the various contractors and dealers in that area. Thus there is a Hamilton district which includes Hamilton and the towns immediately surrounding it. There is a Stratford district, a Windsor district, an Ottawa district, a Niagara district, and so on the idea being to gradually include the whole of the province, each small area having its own local association and being represented on a central provincial executive committee by one or more members. This method of organization is, of course, more laborious and much slower in its formation than a mass association, but it has the merit of being much more permanent and flexible. The fact that one group may be inactive, for a period, does not affect another group, and, indeed, it has proved itself that a small number of groups can function as a provincial organization and carry out most excellent work long before the whole province has become organized at all.

If the various provinces could be brought to the point where they would form or begin to form a provincial executive, built up of representatives of local groups in this same way, we would eventually have a number of provincial executives throughout the Dominion. The next and final step would be a comparatively easy one, viz., to tie in these various provincial executives by the appointment of a Dominion executive composed of one or more representatives from each province.

It is greatly to be hoped that the November convention in Toronto will result in the determination of a final policy for the whole Dominion along some such lines as indicated above. The Toronto convention, as we understand it, will not concern itself to any great degree with the reading of papers or the discussion of technical matters. On the contrary it will be a conference rather than a convention—a meeting together, getting acquainted and discussion of general problems and the best methods of solving them. We urge contractors and dealers of Canada, wherever they may be located, to make a point of being present and take a hand in the presentation and discussion of the many problems that are common to the contracting and merchandising end of the industry. It may mean a little sacrifice in time and money—a temporary sacrifice—but it should mean a very great improvement in the general condition of the industry, a clearing away of much of the debris that is clogging progress at the present time.

The convention will doubtless, have the hearty support of manufactorers, jobbers and central stations, because the progress of the contracting and merchandising end of the industry is a direct measure of the progress of the industry as a whole. Unless the contractor functions properly and unless the electrical merchant functions properly, the industry will continue to stagnate. This convention would appear to offer the greatest opportunity we have ever had of setting the wheels of co-operation in motion in a way that will assure a much more rapid development than we have ever yet experienced.

Canadian Engineering Standards

The sub-committee on rating and testing of electrical machinery held its first meeting in Ottawa on June 16th, Prof. E. G. Burr in the chair. The chairman pointed out that the sub-committee had been formed to consider the advisability of the adoption or formulation by the C. E. S. A. of Canadian standardization rules for electrical machinery, covering the same ground as, and preferably based upon, the rules of the American Institute of Electrical Engineers. As a result of preliminary correspondence, it appeared that practically all the members of the sub-committee were in favor of the adoption of the A. I. E. E. rules, subject to such amendments or changes in arrangement as may be found desirable; this decision was confirmed by the meeting.

Discussion followed as to the best organization for the work, and three Panels were appointed to deal respectively with the rules for rating and testing of:

(1) Large motors, generators, and rotating machinery operating under controllable conditions;
(2) Industrial sizes of motors and generators working under ordinary manufacturing or operating conditions;
(3) Transformers of various types.

The existing transformer sub-committee, would, of course, be consulted as regards the work of Panel No. 3.

Consideration was given to the best method of keeping the sub-committee in touch with U. S. committees working along the same lines, and it was decided that the fullest possible co-operation should be arranged for through the American Engineering Standards Committee.

Emerson Installs Electric Light and Power

On May 9, the rate-payers of Emerson, Man., by a majority of 170 to 25, voted in favor of installing an electric light and power system. This vote ratified an agreement between the Town of Emerson and the Pembina Light and Power Company, Pembina, N. D., covering the supply of electrical energy, and also the expenditure of twelve thousand dollars for the installation of a distribution system.

Power is being purchased at the town's boundary, at the intersection of Main Street and the International boundary, in the form of 3 wire, 3 phase, 2,200 volt, 60 cycle alternating current. It will be supplied continuously during each and every day of the year at the following rates:

For the first 700 kw.h. per month, 10 cents per kw.h.

For the next 1,400 kw.h. per month, 8 cents per kw.h.

For the next 3,000 kw.h. per month, 7 cents per kw.h.

And for all power consumed over 5,100 kw.h. per month, at 6½ cents per kw.h., the town guaranteeing a minimum monthly payment of one hundred dollars.

Power is measured on the secondary side of the step down transformer at the International boundary, the transmission line voltage being 12,000.

The town has signed the agreement for a ten year term and is installing a distribution system which provides for the use of three phase power at 2,200, 550, or 220 volts, and a standard domestic and commercial supply. They are installing a 6.6 ampere, Mazda C, street lighting system of 53 lamps, which covers all of the most densely settled sections of the town. It is expected that power will be turned on for use the first day of September, 1922. The work of the agreements for power, plans, specifications, and installing of the entire system is under the supervision of George L. Guy, 503 Tribune Building, Winnipeg.

Co-Operation

Toronto, June 17, 1922

Editor Electrical News:

At the annual Convention of the Canadian Electrical Association, held this month at Ottawa, and at which the writer was present, the keynote was Co-operation.

It seemed to be acknowledged that something is missing in the industry—each one has been looking after his own cabbage patch—all waiting and wishing for individual success—all willing to pare off something from the other fellow—all talking co-operation and wailing the lack of it—all apparently ready to begin something, yet few daring to attempt.

It is a material fact that all you can get out of anything, is just what you put into it, from Service to Satisfaction.

It does not seem to be a question of individual business organization, nor always a matter of the organization of an association of businesses, but rather a problem of successful handling and dealing with those sections of the trade upon which rests the ultimate success of the individual business or organization.

If we viewed a stage all set, and the players working to their own hindrance, it would be a farce. Yet, isn't that the state of affairs in some industrial and commercial sections, although it passes by the name of Business, or Competition? In actuality it is just a case of grasping the shadow and losing the substance.

To achieve any great success is difficult and undoubtedly distant because the problems are mainly psychological. In other words the problem is a deeply human one.

We nearly all of us are conceited enough to believe that we really know something of human nature. A very little self-examination should reveal that we don't know so much as we think we do, judging by the general mess of matters.

For the same reason we shall not be deterred from trying to study the question a little further with the hope of improvement.

The problem of building a successful business, which embraces satisfaction won in every field, is much too difficult to treat of in a short article. Besides, the writer has not the ability to do it. He can only write as a mere mortal, knowing that something is missing, that something must be fitted into the gap, and do his best to provide further thought for reflection and effort for those who will be able to add their quota of action to secure the success we all desire to get from a co-operative spirit of enterprise.

For this purpose it would seem that we have got to return to, and use, our individualism; because a business or association as such, has no soul and therefore no human element.

It is said that a big business is no larger than the shadow of the man in command. I do not know why a shadow should have been chosen for an analogy. It does not seem fitting. Why not compare the measure of success to the light—something like a big beacon. It would appear much more attractive. Each one can then add his share of light and so make it a torch of progress.

This all concerns the complex machine called man, and we know how impossible it is to analyse the human mind and set it out in simple terms.

It is fully realized that everything except courtesy must cost something. The feeling of co-operation that we are looking for will not hurt the balance-sheet. If the needed endeavours do cost a little, they will surely be profitable; and just as surely, if the efforts are not made, business is going to be profitless. The sole point here being to offer and serve the right kind of effort towards co-operation—that is, something mutually and equally profitable.

Perhaps, Mr. Editor, you could encourage some human letters on this subject, and after analysis, set them out in such a way as to indicate your readers' ideas and aspirations upon a very interesting subject and problem which must have some solution before any real advance is made. No ambitious scheme is needed because it will not work. The journey to Utopia is too far distant for this generation to reach. Any efforts must be modest and sincere. Try to see the other man's point of view, and then let's work together. It can be done.

J. T. Scott,

In our issue of June 15th an item stated that the towns of Winkler and Plum Coulee were purchasing power from the Manitoba Power Co. This should have read "The Manitoba Power Commission."

The Canadian Electrical Association Grows in Vigor with the Industry Itself

Recent Convention in Ottawa Shows Increased Membership and Unremitting Enthusiasm and Activity—Merchandising Receiving more Attention—Valuable Reports and Discussions

The annual convention of the Canadian Electrical Association,—the 32nd—held in the Chateau Laurier, Ottawa, during the days of June 15-16-17, was an unqualified success. Registration was unusually large, and the reports presented by the various committee were full of interest.

Mr. Julian C. Smith, president of the association, occupied the chair during most of the sessions, the business of which consisted largely in the reading and discussion of reports on a number of phases of the electrical industry. The president, in his opening address, briefly summed up the progress of the association during the past year, pointing out the amount of valuable work that had been done, by the different committees. This was followed by the presentation of the treasurer's and secretary's reports, both of which proved highly satisfactory. In this connection Mr. Vinet, the secretary-treasurer, announced the fact that this would be his last year in office, a statement that was received by the members with the keenest regret, realizing as they did, that the successful work of the association during the recent past, has been due in no small measure to Mr. Vinet's capable and assiduous application to the secretarial work.

Thursday morning's further business consisted of reports by J. B. Woodyatt for the Public Relations Section and M. K. Pike for the Membership Committee.

In the afternoon Louis Pratt led off with his report for the Commercial Section.

This report brought out a considerable amount of discussion, particularly covering the need of some form of standardization in the making of contracts and the standardizing of the peak period on which power should be measured. Messrs. Beaumont, Woodyatt, Smith, O'Brien, Doddridge, Barnes and Dion favored a uniform power contract. Mr. Dion also spoke at some length on the necessity for merchandising being carried on with profit by the central stations; propaganda work, too, for better illumination, he thought, must be done by the central station companies. He approves the standard contract for the added reason that it simplified explanations to the public. Mr. Smith spoke of the need and increased use of synchronous equipment for power-factor correction. The Shawinigan company require their customers to maintain an 85 per cent. power-factor. Mr. Woodyatt remarked on the advisibility of penalizing a low power-factor. Mr. Pratt explained that his company penalize below 70 per cent. and pay a small bonus above that amount. The probability of static power-factor correction equipment being placed on the market in the near future was mentioned.

Power Sales Report

Mr. P. R. Labelle, of the Shawinigan Water & Power Company, read the report of the Power Sales Committee, in part as follows:

During the current year this Bureau thought it advisable to try and standardize power contracts for general use throughout the country, and after obtaining copies of power contracts from various member companies, it was considered advisable, owing to different conditions in the different sections of the country, not to attempt to draw up a standard form of power contract but this Bureau desires to draw the attention of member companies, in particular of smaller companies, to the necessity of providing in their contract for the following:—

1st—Power-factor clause.—The larger companies already

The Canadian Electrical Association's Officers for 1922-23

R. J. Beaumont, 1st. Vice-Pres. P. T. Davies, President-Elect A. P. Doddridge, 2nd. Vice-Pres.

provide against loads with poor power-factor realizing the importance of this, but the smaller companies, we find, are overlooking this all-important matter.

2nd—All power contracts should have a minimum guaranteed monthly payment to provide against loss of revenue during shut-down. During the past few years a number of member companies have suffered considerably having no provision in their contract to protect themselves against this loss of revenue, this particularly applies to smaller companies.

All contracts should have a clause stating that the maintenance of voltage and frequency at the point of delivery shall constitute delivery or service.

3rd.—A definition should be made on all power contracts of the basis for the measurement of the power contracted for. A reasonable basis for fair sized loads seems to be a 10 to 15 minute average maximum load; smaller loads can well be taken care of by basing a rate on the size of the motor as designated by the name plate.

In discussing power prices and conditions with prospective customers, reference is frequently made to conditions offered by competitive companies, and it would seem that if all companies adopted a standard basis of measurement it would be to the benefit of all.

During the current year, this Bureau circularized all the member companies drawing their attention to the Electrical Heating courses given by the N.E.L.A. These courses have been given both at the works of the Westinghouse Company and the General Electric Company, and from information received from those who have taken these courses, and from personal knowledge of the Chairman of your Bureau, who had the privilege of taking this course, central stations are strongly recommended to send representatives to attend these courses as they are certainly the means of putting one in touch with the various applications of electrical heating and give one a proper view of the possibilities for this class of business. We believe it is the intention of the N.E.L.A. to make arrangements to continue these courses throughout the year.

This question of Industrial Heating is a very important one to all distribution companies, as being an excellent means of providing additional load. It would seem, however, that before recommending the application of electricity for heating purposes, a very close survey of conditions be made so as not to saddle the customer with apparatus which would not be economical, and thereby avoid dissatisfaction and the condemnation of electrical apparatus for this purpose.

Considerable publicity has been given to electric furnaces for the melting of brass and other metals, but it would seem from the experience of several companies that before recommending apparatus of this kind, serious consideration should be given to the matter, as unless these furnaces can be used at a fairly high load-factor, instead of being a benefit to the customer, they become a burden, owing to the minimum payments which are always provided for in contracts of this kind.

Electric Ranges and Appliances

The electric range load and bake oven load is one that is well worthy of being developed and, owing to the diversity factor of these loads, is productive of a very good revenue to the companies. Serious effort should be made to promote the use of various appliances in the home.

A careful study and survey made by a company in Philadelphia on some 1,300 houses using various apparatus shows that 51 1/10% of the total energy consumed was used from 7 a.m. to 7 p.m., showing that this was entirely used by household appliances, and 49 1/10% was consumed from 7 p.m. to 7 a.m., showing distinctly that the appliance load is equal to the lighting load. This study was made in the summer months, at which time the lighting load does not cross the load or energy used by appliances. This survey was carried on for one whole week, and certainly shows up very plainly the importance of the use of appliances as a revenue producer.

Merchandising

The report on Merchandising by Mr. G. R. Atchison, of the Southern Canada Power Company, was one of the most interesting, as it was also one of the most valuable reports presented at the convention. Mr. Atchison's report is printed on page 45.

The discussion following the reading of this report was keen. Mr. Smith again reiterated the opinion that if member companies enter the merchandising field they must operate this part of their business on just as sound a basis as they do the manufacture or sale of power. Mr. Pike ventured the opinion that the members of the Canadian Electrical Association, being absorbed more or less in engineering matters, were not giving to the subject of merchandising as much attention as its importance deserves. Mr. O'Brien urged the necessity of advertising consistently. Mr. Dion raised the question of the advisability of selling electric ranges on time payments, and received the answer from a number of members that this scheme had been found to work out very satisfactorily. Mr. Reid remarked on the poor equipment of electrical stores; the slovenly appearance of the attendants; the unattractive windows. Messrs. Pratt, Lane and McIntyre also contributed to the discussion.

Report of Industrial Lighting

Following the reading of the report on Industrial Lighting, prepared by Mr. J. H. O'Hara, chairman of that Committee, (reproduced on page 36), an illustrated talk was given by Samuel R. Hibben. Mr. Hibben's remarks were in the nature of an elementary talk, but his illustrations were exceedingly well chosen to illustrate his points. A talk of this nature to electrical contractors and electrical merchants, whose business it is to treat of these matters directly, would be of the greatest assistance. Mr. Hibben made two or three useful suggestions regarding attractive window displays. For instance, a bouquet of white peonies were shown under lights of various colors. If this effect could be produced by an automatic flashing arrangement it would undoubtedly attract a number of passersby and impress them with the wonderful possibilities of color illumination. Mr. Hibben also spoke of an industrial lighting exhibit prepared by his company and shown at many points in the United States. It was a portable building, about 20 ft. by 30 ft., representing a factory and the wiring was so arranged that the various forms of lighting—good, bad and indifferent—could be shown in comparison. The opinion was expressed by many of the members present that permanent model installations of illumination, within reach of the general public, would be a valuable form of propaganda.

Friday Morning June 16th.

A number of interesting reports were read as follows:—Report of Technical Section, R. J. Beaumont; Report of Meter Committee, E. Holder; Report of Electrical Apparatus Committee, J. S. Wurtele; Report of Underground Systems Committee, L. A. Kenyon; Report of Overhead Systems Committee, A. P. Doddridge; Report of Inductive Interference Committee, J. H. Trimingham; Report of Lamp Committee, Watson Kintner.

Mr. Pratt opened the discussion following the reading of Mr. Holder's report for the Meter Committee. He spoke of the very rare cases where the meters in his own company had been found more than 3% fast—only two cases within recent years. Mr. Pratt showed some interesting photographs and charts; the photographs showed a meter installation in a Hamilton home where the meter had been so placed that it was readily read by the meter reader from the outside of the house, thus avoiding the troublesome annoyance of tracking into the home and interfering with domestic arrangements in general. The curves were designed to show the difficulty of fixing a standard time period of maximum demand. One of the curves was that of a rolling mill where the instantaneous demand was very great and the duration of the load very brief. The curve with which this was compared indicated a gradually changing load. If the basis of charge for these two customers were the same, it would manifestly be unfair to the central station.

Mr. Gregory emphasized the point that the correct method of charging must be based upon the capacity of the equipment that is tied up in taking care of any particular load. Mr. Smith urged the necessity of stating definitely in every contract the exact method that would be used in measuring the customer's load. Mr. Woodyatt stressed the same point, suggesting that the period seemed of less importance than the necessity of having a very definite understanding with the customer. Contributions to the discussion were also offered by Messrs. Reid, Baker, Ross, Cam, Labelle, Henderson and Higman.

Mr. Wurtele's report for the Electrical Apparatus Committee also introduced a valuable discussion particularly as regards the rating of motors. Different manufacturers rate their equipment differently and the customer naturally does not understand that a certain higher rating of one manufacturer may not mean any more capacity than the lower rating of another manufacturer. The opinion was freely expressed that if manufacturers could not agree on a standard rating, there should, at least, be a basic rating and a definite ratio between that and the motors of all manufacturers. A motion to this effect was introduced by Mr. Gregory and carried unanimously, which will be brought to the attention of the Canadian Engineering Standards Association, with a request for action on their part. Messrs. Davies, Dion, Dwight, Smith, Maclachlan, Barnes, Pratt, Anderson, Cooper and Mudge contributed to the discussion.

Mr. Kenyon's report on Underground Systems and Mr. Doddridge's report on Overhead Systems were considered together. Mr. Winter, of the Bell Telephone Co., spoke of the possibilities in the joint use of poles. In a number of cases this has been tried out and proven satisfactory, not only from an economic viewpoint but it had the advantage that the landscape was interfered with just so much less.

In the afternoon the report of the Accounting Section was presented by Col. D. R. Street, who urged the necessity for a nearer approach to standardization and closer attention to the accounting side of the business, particularly in smaller companies. Col. Street was followed by Mr. Paxton Little of Niagara Falls, who spoke of his experiences along the same line.

The accident prevention report was presented by Mr. Wills Maclachlan and spoken to by Chas. B. Scott, manager of the Bureau of Safety at Chicago. Mr. Scott has had an unusually wide experience in safety work and has studied it from both the economic and the humanitarian side. He laid down certain rules which he considers absolutely essential if safety work among employees is to be a success. These are as follows:—1. the backing of the management; 2. an organized scheme of education and operation of safety principles; 3: obedience to rules. Mr. Dion moved a hearty vote of thanks.

Social Functions

Luncheon on Thursday brought all the delegates together for the first time. The speaker was Mr. A. Monro Grier. Mr. Grier was at his best and delighted the members guests and ladies president by a glowing word picture of the aims and the destinies of the electrical industry, of which the Canadian Electrical Association formed such an important part. Taking "Loyalty" as his topic, he urged the support of every member to the end that the Association may perform efficiently and effectively that part in developing the industry for which it was specially adapted and constituted. In closing, he spoke of the pleasure the Canadian Electrical Association always experienced in having a number of prominent guests from across the line, and expressed the hope that the interchange of ideas between some of the best minds in the industry, would result in profit to everybody present.

The luncheon on Friday was held in collaboration with the Kiwanis Club. Mr. Howard Murray, M. P., of Montreal, was the speaker. Mr. Murray's theme dealt chiefly with the wonderful waterpower resources of the province of Quebec and the industrial developments that had followed the development of these waterpowers. He explained how these waters were being utilized to the fullest extent by the construction of storage dams and drew a glowing picture of the future industrial development of the province. Ample waterpower, an industrious people, an engineering profession highly endowed with ability and industrial leaders possessing capital, courage and foresight, all foretold a future of uninterrupted activity, development and prosperity.

The climax in the entertainment features was reached on Friday evening when all the delegates, guests and ladies met for dinner at "Holmstead Inn", across the river on the Quebec side. Mr. Smith again presided and a number of address followed. W. H. Whonken representing the president of the National Electric Light Association, read a message from that Association to the C.E.A. Lawrence W. Davis, special representative of the National Electrical Contractor-Dealers' Association, spoke of the work of his association and the urgent necessity of developing an electrical merchandising class of men so that the products of electrical manufacturers may be passed along economically and quickly to the general public. Mr. Lane, a special representative of a group of electrical organizations, of which the N.E.L.A. is the moving spirit, and whose endeavors at the moment are particularly directed to the development of better business conditions in the electrical industry, also spoke briefly. Mr. George D. Leacock, the last speaker proved a fitting link between the heavier part of the entertainment, which had gone before, and the lighter part which was to follow. Mr. Leacock delighted his audience with some, timely stories and a few typical original comments on things in general as he saw them, after which the gathering adjourned to the dancing rooms below.

Officers and Advisory Committee

President: P. T. Davies, Southern Canada Power Comp., Montreal.

1st. vice-president: R. J. Beaumont, Shawinigan Water & Power Company, Montreal

2nd. vice-president: A. P. Doddridge, Quebec Railway, Light, Heat & Power Company, Quebec City, Que..

3rd. vice-president: L. W. Pratt, Hamilton Cataract Light & Traction Company, Hamilton, Ont.

Secretary-Treasurer: To be appointed.

Executive Committee

The Officers and: Chas. T. Barnes, Toronto & Niagara Power Co.; N. S. Braden, Canadian Westinghouse Co.; W. A. Bucke, Canadian General Electric Co.; A. B. Cooper, Ferranti Electric Co.; A. A. Dion, Ottawa Electric Co.; A. Monro Grier, K.C., Canadian Niagara Power Co.; J. S. Norris, Montreal Light, Heat and Power Co.; M. K. Pike, Northern Electric Co.; J. C. Smith, Shawinigan Water Power Co.; W. L. Weston, Nova Scotia Tram. & Power Co.; W. H. Winter, Bell Telephone Co.; J. B. Woodyatt, Southern Canada Power Co.; The president, National Electric Light Association, New York.

Address of President Julian C. Smith to the Delegates at the Canadian Electrical Association Convention

In addressing you this morning for a short time, I am sure our guests will pardon me if I make a few comments and suggestions about our own Association, its needs and policy.

To be of value any organization must be powerful in its own field. Power indicates strength, and so the Canadian Electrical Association must continue to increase its membership, and thereby gain in influence and also in financial ability to carry out whatever policy may be decided on. We do not want a tea party, we want an association clear headed in its ideas, and strong enough to go out and demand, if need be, those things which will benefit not only our association, but also the whole people of Canada. The individual growth of a nation may now be measured by the per capita use of power. Canada, like all the highly civilized countries, is rapidly changing from an agricultural state to an industrial state. This change can only go on with power used on an ever increasing scale; so our own industry, which is fundamentally based on the use of power, must use all proper methods to encourage and direct the development of the use of power in Canada.

I think the time has arrived when this association should adopt the principle of a permanently paid executive-secretary and I ask your consideration of this important matter.

We should change our by-laws so that the position of secretary-manager is created, and the post should carry compensation enough to justify the efforts we want.

When I assumed the office of president of this association a year ago—an honour, gentlemen which I assure you I deeply appreciate—I determined that if possible I would continue the very able work so well carried on by my predecessor in office, and also try to carry out certain policies which I thought were of great importance.

Increase in Membership

The increase of membership has had the earnest consideration of our executive committee. A special committee was appointed to deal with this matter and the result was that our total membership was increased by 176, an increase of 56 per cent. There are still a few important public companies who are not members of our association. We need these companies, we want the help and advice of the executives who head them, and we believe that the C.E.A. gives in return benefits which more than compensate for the time and money involved.

We have developed another innovation this year. The large executive committee proved too large and difficult to get together frequently. We created a small committee which met on several occasions and which assisted materially in the transaction of the business of the association.

Our special committee have worked hard, and the reports you will receive at this convention bear witness to the fact that the committee members and the chairman have given liberally of time and ability for the good of the association.

We have kept in constant touch with the N.E.L.A.

Personally, I have been unable to attend many meetings and discussions to which I have been asked, but I have sent our secretary to all important ones, and his reports are very interesting and valuable. I am sure, too, that he was able to give something also to the meetings which he attended, as well as receive a great deal.

We started a circular letter to the Members with the thought that more interest and co-operation in the C.E.A. would result. Judging by the many letters received the plan was successful, and the next president may find the scheme well worth carrying on, possibly on a broader scale.

An important step was taken during the year by the incorporation of the association by Letters Patent of the Dominion of Canada. Previously, we had no legal status and strictly speaking had no right to function, collect money, own property or do any of the things which we have been doing for many years. We now have a charter, and at this convention the change will be made of taking all the old members into the new incorporated C. E. A.

The new by-laws are practically the same as the old; so far as the members are concerned the whole affair is only a formality which must be gone through with, to insure the C.E.A. a position from which it can go on in the future.

Finances in Good Shape

The finances of the C.E.A. are good. You will hear the report of the secretary-treasurer and will note that we have a balance left, after paying all our expenses.

In connection with the finance, we have deemed it wise to appoint a firm of chartered accountants as auditors of the C.E.A. The auditor's report is attached to the general statement.

Before closing his part of my report, I wish to express my appreciation of the co-operation and help which all the members of the CEA executive committee have rendered during the year. They have all worked hard and if anything good has been accomplished, it is due principally to the work of each individual member of the executive committee.

It is dangerous to pick out special men to thank, but I am sure that the men on the committee will agree with me that Mr. Dion has been a tower of strength and help to the president throughout the year,, and has always been willing to take on any burden suggested. It is largely due to Mr. Dion that this convention is such a splendid success. Mr. Dion—on behalf of the C.E.A. permit me to express our thanks tc you and your colleagues for the great work they have done here.

Water Powers of Canada

To turn to another subject for a few minutes, I wish to speak of certain features of our own industry. A very able Department of the Government—the Water Power Branch—headed by Mr. J. B. Challies, has published during the past year some exceedingly interesting and valuable reports on water powers and the growth and use of water powers in Canada.

I do not desire to repeat what these reports indicate except the summary that the power capacity of water power stations used for all purposes, is at present increasing at the rate of about 200,000 h.p. per year. It may be fairly stated that at least three-quarters of this amount is for electric station use, and represents the growth of our own industry in Canada. It seems probable that for a number of years this rate of increase will be maintained or exceeded.

Taking the capital cost—including all items of financing, etc., into consideration, there must be invested at least $200. for every horsepower, to deliver that power to the consumer. 150,000 h.p. at $200 per h.p. means investment of $30,000,000, in capital expenditure for this kind of work. A little less than half of this amount is financed in Ontario by the Government owned utilities, and the balance we must look for through the investment houses of Canada.

Hydro-electric utility bonds and other forms of security, have and are enjoying a well deserved reputation in Canada. I want to press this phase of the situation forward, because in this country we hear a great deal of the engineering, operating and political sides of the problem, and not so much of the most important of all—the financial and economic.

Knowing the local conditions, engineers and operators, members of this association can build and operate plants in Canada better than any others. We are just begining in a big way to do this work. I want to urge upon all our members to think first of all of the financial sides of their problem. The best engineering is really the cheapest, but the management should, and must, exercise the greatest economy in all capital expenditures.

Consideration of Financial Problems

In the early stages of the financing, a careful balance must be maintained between the needs of the enterprise and the cost of financing. Many a good scheme has been badly crippled for life by starting out carrying too heavy a burden. For several years past the cost of financing has been so high that only our best companies could afford to do anything.

In 1912 the average cost of money to good hydro-electric enterprises was about 5%. In 1921 this cost had increased to about 8% or 9%, a prohibitive figure for expansion. In 1922 we see an improved condition; the good companies can finance to-day for about 6% to 6½%, and we are confident that within a year we can get money on a 5½% to 6% basis. This is a vital matter, as it means we can now look forward to the development on a large scale of our waterpower resources, and further we can make plans for such development reaching several years into the future. The fact that money is getting cheaper will also push higher the market value of those dividend paying stocks that pay from 6% to 8%, and as these stocks go up the whole question of raising new capital for more extensions gets easier.

There is no enterprise more affected by the cost of money than the development of waterpowers. The cost of power on the bus bars of a waterpower station is made up of about 85% interest charges and 15% operation, maintenance and taxes. Just a word about taxes.

Just a Word about Taxes

Taxes which before the war constituted only about 1% of the total cost of power, now amount to some 7% or 8%, and in many cases are equal to or greater than the combined operation and maintenance. This matter is of importance in considering government owned as against privately owned utilities. It is also important as a powerful urge to our association to co-operate with others in working out the problems of this country so that taxation may be reduced.

And now, as I have nearly finished, I want to make a plea for this Association. It is evident, I think, from the remarks I have made, that there is in Canada a great need for just the kind of an association that we represent. We should do everything possible to strengthen the hands of the executive of the C.E.A. and both with money and work help build up a strong, able association, which in turn will be of great use to the electrical industry in Canada.

Good Lighting an Essential in the Efficient Conduct of Business

Expenditure of One Half of One Per Cent. of the Pay Roll Increases Output Five Per Cent.—A Saving Equal to Ten Times the Expense

By J. H. O'HARA*

When adequate and satisfactory illumination is substituted for the all too prevalent poor illumination in factories and other working places, the results obtained are mutually beneficial not only to the employees and the employers but to the country as a whole. Under proper illuminating conditions the health, contentment, safety and skill of the employees are maintained at a high standard, the output is increased in quantity and improved in quality, while there is a proportional reduction in the cost of each unit of finished products that reach the public.

While it is desirable to have adequate illumination of the working areas, it is more desirable and essential to proper results to eliminate that light which otherwise would pass directly from the lamps to the eyes of the workers. That is, one must avoid direct glare, which is fatiguing to the eye and causes incorrect estimation of sizes and location of objects in the field of view.

Glare effects may be caused not only by light reaching the eye direct from the sources having a brightness greatly in excess of the brightness of the objects viewed, but they may be produced by excessive reflection—called reflected glare—from the objects within view. In factory lighting each lamp should be so located that the eye does not see it in the ordinary course of work, and so shaded or covered that brilliant reflections are avoided. The desired result can be obtained by putting over the lamp an open shade, which screens it and directs downward much of the light which would otherwise be either of no value, or actually detrimental. Or the lamp may be surrounded with a diffusing globe, dense enough so as not to reveal the form of the actual light source within, but to give the effect of the light pouring from the globe as a whole.

While the necessity of good lighting is so evident that a listing of all its effects may seem commonplace, these same effects are of such great importance in their relation to factory and mill management that they are well worthy of repetition and careful attention.

The effects of good illumination and bright and cheerful surroundings include the following items:—

(1) Reduction of accidents.
(2) Greater accuracy in workmanship.
(3) Increased production for the same labor cost.
(4) Less eye strain.
(5) Promote better working and living conditions.
(6) Greater content of the workmen.
(7) More order and neatness in the plant.
(8) Supervision of the men made easier.

In this list it will be noted that items 4, 5, 6, 7 and 8 all have a bearing on accident prevention.

A study of this subject convinces one that—aside from the humanitarian standpoint—the expense incurred in obtaining satisfactory illumination will in practically all cases result in good financial returns.

While the major consideration in the eyes of the factory or mill owner is undoubtedly and quite naturally the money value of good light in the larger return of both quantity and quality of work which may result from the installation of a superior as compared with an inferior lighting system, it should be noted that it is very difficult to interpret into dollars and cents the value of good light made possible by such returns. This difficulty is due to the necessity of keeping all conditions in a factory or mill section absolutely constant while varying the amount of illumination from poor to good conditions, in an effort to determine the output and its dependency on the light facilities. As accurate data becomes available, giving the increases in production for certain specific improvements in artificial lighting, it will doubtless prove helpful to a proper interpretation of adequate light and its worth to any plant.

The eight foregoing points are emphasized as forming the most important features in the problem of good lighting. Although difficult to interpret into money values, and somewhat intangible, they are indisputable arguments in favor of the best available from the standpoint of the factory or mill owner.

A Practical Example

Continuing from the manufacturer's point of view it may be said that certain assumptions as to energy costs, cleaning, interest and depreciation, show that the annual operation and maintenance cost for the illumination of a typical shop bay of 640 sq. ft. area, may be taken at $50.00. If five workmen are employed in such a bay at an average wage of say 25 cents per hour, the gross wages of the men in such a bay, plus the cost of superintendence and indirect shop expense may equal from $5,000 to $7,000 per annum. In a case of this kind, therefore, the lighting will cost from 7/10 to 1 per cent of the wages, or the equivalent of less than 4 to 6 minutes per day. We may roughly say that a poor lighting system will cost at least half this amount (sometimes even more through the use of poorly arranged inefficient lamps,) or the equivalent of say 2 to 3 minutes daily, and the installation of good lighting will unquestionably easily pay for the difference between good and bad light, through the time saved for the workmen.

Actual Losses

Superintendents have stated in actual instances, that due to poor light their workmen have lost much time, sometimes as much as from one to two hours per day on certain days. If good light will add an average of say one-half hour per day to the output, these 30 additional effective minutes represent an increase in output of 5 per cent., brought about by an expenditure equal to one half of one per cent. of the wages for improved lighting, or a saving equal to ten times the expense.

Remarkable improvements have been made in the electric lighting field. Possibilities in factory and mill lighting are now obtainable through the use of the new gas-filled lamps which were previously unthought of or considered impossible. Consideration of the eye as a delicate organ, together with the new ideas as to the times which affect its comfort and efficiency have resulted in establishing certain principles in illumination work and have directed attention naturally and in a growing manner to the proper use and application of these new lamps.

We now have a new era in industrial illumination, a distinctive feature of which is the scientific installation of lighting units, suiting each to the location and class of work for which it is best adapted. While certain outstanding cases of improved lighting exist in Canada, there are far too many instances of very poor illumination conditions, where the intensities will not check up with the minimum values of illumination that should be found in a factory as shown in the following recommendation for minimum intensities of illumination:

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*Before the C.E.A. Convention.

Minimum Illumination

	Minimum foot-candles on the space or at the work.
(a) Roadways; yard thoroughfares	1/50
(b) Storage spaces; aisles and passageways in work-rooms, excepting exits and passages leading thereto	1/4
(c) Where discrimination of detail is not essential Spaces, such as hallways, stairways, exits and passages leading thereto; toilet-rooms, elevator cars and landings. Work, such as: handling material of a coarse nature; performing operations not requiring close visual application; grinding clay products; rough sorting; coal and ash handling; foundry charging,	1/2
(d) Where slight discrimination of detail is essential Spaces, such as: stairways, passages and other parts of power plants where there are exposed moving machines, hot pipes, or live electrical parts. Work, such as: rough machining, rough assembling; rough bench work; rough forging; grain milling.	1
(e) Where moderate discrimination of detail is essential Work, such as: machining, assembly work, bench work, fine core making in foundries.	2
(f) Where close discrimination of detail is essential Work, such as: fine lathe work, pattern making; toolmaking; weaving light colored silk or woollen textiles; office work; accounting; typewriting.	3
(g) Where discrimination of minute detail is essential Work, such as: watchmaking, engraving, drafting; sewing dark colored material.	5

The above are minumum requirements such as are necessary for bodily safety, and are not to be taken as productive intensities in accordance with the accepted modern illuminating engineering practice. To illustrate, the intensities shown would enable a machine operator to see moving wheels and belts if 2 foot-candles were provided on the work as called for under the listing "E" under the head of "Moderate Discrimination of Detail," but such illumination would not enable the operator to easily discriminate between moving gears, or caliper a spindle or read a micrometer.

Types of Reflectors

In the industrial lighting field there are at present three distinct types of reflectors, which are especially worthy of consideration. The relative advantages and disadvantages of these types are indicated in the following tabulation, brought out as a result of the tests made over a period of many months by a committee of consulting engineers employed for the purpose by the State of Wisconsin.

A description of these reflectors might be of value. Porcelain enamelled reflectors are made of steel, on the surface of which is coated a bath tub enamel. This enamel coating must be dense, so that as little light as possible penetrates to the steel, for all the light that reaches the steel base is absorbed and absolutely wasted. Enamels vary considerably in efficiency, and if of two reflectors one appears grey in comparison with the other that one is sure to be considerably lower in efficiency.

The R. L. M. Standard reflector is a porcelain enamelled steel reflector and is an attempt on the part of the reflector and lamp manufacturers, who jointly worked out this standard, to make it easy for the industrial management to secure good illumination. A number of the leading reflector manufacturers make this type.

Mirrored glass reflectors are made of clear glass blown in the shape of a reflector, on the exterior surface of which a thin layer of silver is coated, and this in turn covered by a protective enamel. To eliminate the brilliant images of the lamp filament or streaks and striations which would appear on the surface illuminated, the reflector surface is corrugated.

Prismatic reflectors are made of clear optical glass with many small prisms composing the entire body of the reflector. Light control is accomplished by the use of totally reflecting prisms which are arranged in definite relation to the light source. The prismatic reflectors and units are designed according to carefully worked out engineering calculations. Their prisms may be refracting, reflecting, or diffusing, and any type of light distribution may be secured with the greatest possibility of accuracy and flexibility.

Since the light in the case of the industrial units is reflected by clear glass only, the absorption is low and the efficiency of these reflectors is exceedingly high.

Indirect Lighting

During the past few years there has been a growing tendency to employ indirect lighting in industrial service. In general, indirect lighting will be found desirable and profitable where a combination of the following conditions exist:—

(a) Work involving rather close discrimination of detail.
(b) Flat ceilings with relatively few obstructions such as overhead belting.
(c) At least moderately clean conditions of work, with respect to dust or oily dirt thrown by belting of machines.
(d) Moderate number or large number of workers per unit of floor space—say 15 or more per thousand square feet.

Where the product of the work is of particularly valuable character or where errors of the worker will result in especially costly losses, indirect lighting will generally be desirable even though not all of the above conditions exist.

Indirect lighting is especially to be recommended for many of the operations of the textile industry.

The advantages of indirect lighting arise from the facts (a) that, properly installed, it is equal or even superior to daylight with respect to minimum eye fatigue and eye strain; and (b) that it eliminates sharp shadows of an objectionable character. These advantages not only make for the safety of the worker and for good hygienic conditions, but they stimulate production and decrease spoilage to an important degree.

Spacing of Units

Proper spacing of indirect units may be easily determined as follows:—Subtract 3 feet from the ceiling height of the room; multiply the result by 1.8 to determine the best spacing; or multiply by 2.4 to determine the widest permissible spacing. In general sufficiently satisfactory results will be obtained if the spacing does not exceed twice the

A group of delegates to the Canadian Electrical Association

value obtained by subtracting 3 feet from the ceiling height. For the same size of lamp indirect lighting units will produce about 60 per cent. the illumination on a 36-inch horizontal plane secured with the shallow-bowl porcelain-enamelled reflector, provided the ceiling finish is white.

It will be noted that light units may be spaced considerably further apart when indirect lighting is employed than when direct lighting is employed. This results in the use of fewer light units; so that while the cost of one indirect unit is greater than that of one direct unit, the total cost of installation is usually approximately the same. Indirect units should be mounted at such distance below the ceiling that the entire ceiling is lighted to an approximately uniform degree.

Treatment of Special Case

A special condition sometimes met with in indirect lighting installations, a condition where special treatment is required, deserves special notice. The condition referred to is that where the worker stands close to the wall of the room, facing away from the wall, the work being approximately vertical and facing toward the wall. The ordinary type of indirect lighting installation will not produce, under these conditions, sufficient intensity of illumination on the work. To provide such adequate illumination, the upper portion of the wall behind the worker should be painted white to a distance of approximately five feet from the floor, and angle reflectors should be so located as to brightly light this wall, the spacing of such reflectors being half the spacing of the indirect lighting units which illuminate the rest of the room.

Avoid Local Lighting

Local lighting is generally to be avoided, though there are occasional industrial conditions where its use may be preferable to any system which provides only general illumination. The most frequently experienced objection to local lighting, and one of very considerable importance, is that the local light of one workman is apt to be so adjusted by the workman himself as to shine into the eyes of any other workman, thereby involving both eye fatigue and a danger hazard, often of serious magnitude. Where local lighting may properly be employed, it is seldom desirable to use a larger lamp than the 50 watt size. Indeed, the 15 watt lamp or the 25 watt lamp is usually preferable, while miniature lamps of very low voltage also have their proper field of application.

Yard Lighting

Although the illumination required in yards is of a much lower order of intensity, the same general principles apply as for interior lighting. In general, lamps may be installed farther apart than for interior lighting, by using special widely distributing reflectors, but care must be excercised that the illumination at any point is secured from more than one direction, otherwise there may be deep shadows cast, where there ought to be light to reveal danger points. This sets certain limits upon the area it is desirable to attempt to illuminate from a single source. Yard lighting lamps should be mounted at least 20 feet above the ground level, higher if possible, to shorten the shadows and minimize glare. If the lamps must be installed lower than 20 feet, lamps larger than 100 watts should not be used. Shallow bowl porcelain-enamelled reflectors of the weatherproof type may be used to good effect, but the spacing between units should never exceed four times the height above the ground. Prismatic refractor units permit a spacing between units of eight to ten times the height above the ground.

Flood Lighting

A comparatively recent development particularly adapted to yard lighting is the flood lighting projector. It is very useful in cases where the conditions make it necessary to install the lamp at a considerable distance from objects or areas to be illuminated. It is of great value for safeguarding property, for facilitating the carrying on of night construction work, for factory and switching yards, docks and piers, enabling necessary night work to be carried on at day-time efficiency. The flood light is not designed to throw a concentrated beam, but rather to spread light evenly over a comparatively large area. Some makes of these lamps are provided with a focussing device, by which the projecting light may be made to suit conditions, giving a concentrated ray for long distance and a wider, more diffused, light for nearby use. It is especially valuable where conditions make it impracticable to use the ordinary type of lamp and reflector, and where a span or a bracket cannot be used.

Maintenance

No paper on industrial lighting could be considered complete without reference to the very necessary question of maintenance. Lighting installations are designed to give desirable initial illumination intensities on the work, but if the illumination is to continue satisfactory, adequate maintenance must be instituted. In time, lamps, globes, and re-

Convention recently held in Ottawa, containing many well known central station figures

flectors become covered with dirt. The lamp bulbs become black and burn out; reflectors are damaged; and the electric wiring may become defective. Due to any or all of these causes the illumination in the shop deteriorates to the point where complaints are produced. The losses of time from such circumstances when totalled for a period of a year will be found, in all probability, to exceed the expense of systematic attention to such items in advance.

The loss of lighting through dirty lamps and reflectors in the average plant will run from 10 per cent. to 12 per cent. per month, and there are cases on record of losses as high as 32 per cent. in seven weeks.

Enormous losses have been shown by dirty walls and ceilings also. Those ceilings, stained and darkened by smoke and dust, are some of the initial causes of inefficiency in illumination.

A Case in Point

An office lighting installation recently examined is a case in point. The installation consisted of indirect units and had been in operation two and one-half years. The ceiling had been painted a flat white and the walls finished in a light buff. At the time the installation was made the intensity was adequate. The engineer who investigated this installation in response to a complaint found that the average illumination on the desk tops was 2.7 foot-candles, unquestionably too low for office work:

(1) The reflectors had been wiped out at regular intervals, but when taken down and thoroughly washed, the illumination jumped at once to 3.7 foot-candles—an increase of over 35 per cent., upon washing what appeared to be fairly clean reflectors.

(2) The lamps had been in service for more than two years. Furthermore, it was found that their rating was several volts higher than the average voltage of the circuit. When new lamps of proper voltage rating were substituted, the illumination increased to over 5 foot-candles.

(3) The ceiling of this office, which two and one-half years ago reflected about 75 per cent. of the incident light, had become soiled through soft coal smoke to the point where it reflected 53 per cent. The inside walls had depreciated in like proportion. Refinishing the office in its original tone further increased the illumination by about 40 per cent., or to a total of over 7 foot-candles.

Here is a case where failure to observe simple maintenance requirements resulted in an intensity of 2.7 foot-candles where an intensity of over 7 was being paid for.

There are two methods by which the maintenance of any selected standard of intensity can be assured; first, by allowing for an enormous depreciation in the light and, consequently, using much larger lamps than would ordinarily be considered necessary; and second, by maintaining the system properly and allowing for reasonable depreciation.

The second, or practical, method involves:—

1.—The use of a depreciation factor, or factor of safety, in the original design of the system to insure adequate illumination when the system has depreciated a normal amount.

2.—The cleaning of lighting units at regular, frequent, intervals.

3.—The replacement of lamps which have become blackened in service by abnormally long life.

4.—The use of lamps of the correct voltage rating for replacements.

5.—The refinishing of ceilings and walls when necessary.

Expert Assistance

The advantages of securing expert assistance in dealing with problems in illumination cannot be too strongly emphasized. The points which come up for solution are complex and varied, and require in many cases the judgment of one who has had wide experience in the lighting field.

Instruments for Determining Illumination Intensity

The foot-candle meter is the simplest and least expensive instrument having a stationary lamp and scale. The brightness of this comparison or standard lamp is regulated by a rheostat and volt meter, previously calibrated in a laboratory. When the lamp is held at the proper brightness, the spot on the scale that appears to fade out is receiving an equal amount of illumination from the comparison lamp and from the outside source of illumination, thus indicating directly the value of illumination falling upon the scale from above.

The light meter is similar, except that the battery, ammeter and photometric head are all assembled in a single tube. The comparison lamp and battery are in an inner case, to the end of which is attached the ammeter and rheostat, and which slips inside of the outer tube. The distance between the comparison lamp and the photometer cube is regulated by moving the whole inner case on which is engraved a scale reading directly in foot-candles. The ammeter is attached directly to the rheostat, and the current in the lamp is regulated by turning the ammeter about its axis. No auxiliary battery case is needed with this instrument, since the standard lamp is supplied by a regular flash-lamp battery slipping within the tube.

Bridging the Gap Between City and Country with Electrical Conveniences

An Interesting Review of the Progress That Has Been Made in Reaching the Rural Districts

By P. T. DAVIES*

A questionnaire was issued to Member Companies and it was found that there was no similarity between the rates or procedure as to ownership of extension or as to the practice in financing extensions; neither was there any similarity in the amount of electricity used by farming customers in different sections of the country, and finally, the farming customers as such, are practically non-existent on the lines of the Public Utilities operating in Canada.

Definition of Rural Extension

An attempt to define a rural connection has been made by the N.E.L.A. Committee, so far without arriving at any standard. It was thought that any extension outside of municipal limits, in which an operating Company has a franchise, might be considered as a rural extension; on the other hand, for tax evasion purposes it is frequently the case that a community will spring up just outside municipal limits and that the type of business to be served will be exactly the same as within the municipality. Such customers might be considered as urban customers, but there is always a point where business thins out and the customer of the rural class, i.e., one requiring special investment, will appear. Again, such districts as a rule, are not incorporated and do not contract for street lighting service and the revenue per pole is therefore reduced.

Investment by Companies in Rural Lines

It was thought that where the density of customers is more than 10 per mile, that Companies might possibly invest some money in the construction, but care must be taken to watch all the items on the debit side.

Ownership of Lines

It seems essential that Companies should retain ownership of lines. The reasons are well set forth in the N.E.L.A. Committee's report, and are briefly that customers are not able to maintain lines properly and are liable to let them run down; secondly, they are not strong enough financially to take care of any liability, so that such liability might revert back on the Company; thirdly, they take up valuable right-of-way, and if such lines are at any time required to carry higher voltages or are changed to transmission lines, it is not easy to arrange the change.

Payment of Line by Consumer

Payments for lines are better made outright or 50% before starting the work and the balance on completion. It is very necessary to have a definite understanding as to what is to be paid, and a lump sum is preferable.

If the line is built for cost, the word "cost" should include a definitely stated overhead, otherwise it is difficult to establish such items as purchasing expenses, rents, etc., which are a legitimate charge against all material handled. Wherever possible, farm help should be used, and all material such as poles, obtained in kind; this cuts down the amount of money which the farmer has to supply in cash.

When making contracts for building lines for customers, arrangements should be made to have the customer trim all trees on the extension.

Permanency of Business, Experience of Rural Telephones

There is already considerable experience, both in Canada and the United States, of cases where farming customers have discontinued their use of telephones in such numbers as to make it impossible to give service even at cost.

In a case in Ontario recently, the rates were raised a very small amount, i.e., from $15.00 to $18.00 per annum, and out of 2,200 telephones affected over 600 were taken out.

Farming districts often run down and the farmers move into town. There is no certainty that farms will be permanently occupied, the New England example being a case in point.

There are other classes of business in small communities which cannot be depended on. The sash and door factories are seldom permanent and grain grinding often drops off, business being entirely dependent upon the operations of the big milling companies who reduce the price of feed and put the small grinding plants out of business. Quarries and brick yards are also very uncertain; several cases are known of quarry districts which have been fine revenue producers, which are idle to-day without much possibility of their ever re-opening. Mining is also precarious, and no money should be invested by companies to deliver services to mines. Small railroad division points are also subject to change and removal, and coaling points on railroads similarly change with a change in management or traffic density.

Great care should always be exercised in making extensions for business which may as time elapses, disappear.

Apparatus for use on Farms and KW.H. to be Expected

The following apparatus can be used on farms with the following approximate kw.h. per month:—

Lighting	from 15 to 30 kw.h.
Cooking	from 150 to 300 kw.h.
Pumping	from 10 to 200 kw.h.
Milking	from 100 to 200 kw.h.
Silo-filling	100 kw.h. per annum
Chaff cutting	30 kw.hrs. to 50 kw.hrs. per month
Refrigeration	150 to 200 kw.hrs. per month
Wood cutting	100 kw.h. per annum

Fallacy of Selling Silo-filling and Threshing Outfit to Farmers

Silo-filling calls for a 7½ h.p. motor and the use is about two days per annum. Threshing calls for 10 h.p. with the use of two days per annum.

It is much better to let the farmer take care of this business with a gas engine.

Wood sawing is not at all a profitable load, requiring 5 h.p. motor at least and being used a few hours per annum.

Transformer Losses and High Maintenance Cost of Lines

Transformer losses on rural lines can easily exceed the kw.h. usefully employed. The power-factor also is very low on these lines and the resulting cost to the Company is much higher than for city service. The diversity also is very poor and generally a transformer is required for each customer. Assuming for the smallest class of customer that a 2½ kv.a. transformer is used, the loss on this would be at least 30 watts; this taken over a whole year requires 263 kw. hours.

Power-factor on this energizing current is around 18% to 20%; when it is considered that allowing for diversity, lighting consumers average only 100 watts apiece, it will

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*Before the C.E.A. Convention.

DATA OF CERTAIN RURAL ELECTRIC LINES IN WISCONSIN OWNED BY THE FARMERS

Company	Average rate first K.W. Hr. cents.	Minimum monthly charge	Revenues, 1921.	Expenses, 1921	Amt. left for return and depreciation. 1921.	Minimum depreciation requirement 1921.	Minimum return, 1921.	Deficit, for 1921	Deficit per consumer, 1921.	Average consumption per consumer, 1921.	Energy purchased 1921, K W. Hr.	Energy sold, 1921, K.W.Hr.	Per cent loss.
*A	12	$2.00	$4,779.33	$4,774.12	$ 5.12	$1,633.41	$3,266.88	$4,895.20	$48.95	$46.00	$101,940	55,348	45.7
B	10	1.00	282.70	317.16	34.46	140.48	280.96	455.90	56.95	31.00	6,984	2,964	57.4
C	18	3.50	564.91	‡801.40	236.49	360.00	720.00	1,316.49	57.40	9.00	9,240	2,518	73.0
D	15	3.50	498.06	464.54	33.52	133.00	266.00	365.48	30.46	....	5,477	....	....
E	†10.1	‖	2,681.54¶	2,348.18¶	333.36¶	653.31¶	1,306.69¶	1,626.64¶	27.11	41.00	30,701	17,182	44.0
F	13.2	3.50	922.65	796.21	126.44	140.00	280.00	293.56	21.00	....	10,938	....	....
G	14	2.00	85.18	151.92	66.74	156.46	312.93	262.29	37.60	....	¶¶1,340	....	....
H	30	.....	1,507.07	1,381.89	125.18	368.00	736.00	978.82	36.50	43.5	49,400	14,140	71.6
I	13	.....	....	....	......	70.00	140.00	**510.00	‡‡67.75	....	....	....	....
J	9.8	††	1,638.81	1,195.31	443.50	461.00	922.00	939.50	24.60	21.6	22,260	9,856	56.0
K	11.2	1.50	1,129.09	1,264.99	135.90	261.00	522.00	918.90	23.60	22.6	36,804	10,600	71.0
L	......	.....	941.06	1,167.78	226.72	140.92	281.84	649.48	23.20	.....	7,941	......	..
M	12	1.25	407.24	327.16	80.08	132.80	265.60	318.32	18.70	.....	9,171	......	...

*Company has grist mill on line which consumes about 1000 K.W. hour annually. ‡Cost of energy plus meter reading, labor only. †Minus 1 cent discount. ‖ Rural charge, 1½ K.V.A. transformer $2.50, 3 K.V.A. $3.50, effective last two months. ¶Seven months only. ¶¶Five months only. **Yearly requirement for minimum bill, depreciation and return. ‡‡Same as ** per consumer ††Demand charge of $1.00 per month-added.

be seen that the extra demand to take care of transformer losses represents 30% on the demand 100% additional kw. hours.

The maintenance cost of lines, meters, transformers, completely outside of the commercial cost of billing and collecting, assumes a figure approximately $100.00 per mile per annum, when the maintenance has reached a steady point.

The Committee feels that it is good policy to maintain reasonably good voltage in small rural communities, as otherwise the use of appliances is non-existent and the service not popular. Good voltage will increase the revenue obtained per customer.

A factor which cannot be neglected, is that of inductive interference. Companies are liable to create such conditions if rural lines are put up near telephone lines and the cost of straightening out the interference is considerable.

Rates, Whether Special or Anchored to Nearest Town Rate

It would seem advisable to use the rates in the nearest municipality and add a fixed charge to cover extra transformer losses, increased cost of billing and collecting, and extra maintenance costs. This fixed charge can not be less than $2.50 per month.

Meter Reading Methods, Bi-monthly, etc., Post-card Readings

It is reported that in outlying districts, several Companies are using post-card readings with satisfactory results.

Meter reading is an expensive business in rural communities. Various methods are being used to cut this cost; reading every two months is quite satisfactory and the meter reader should always collect at the same time. In some cases readings are being telephoned in by the farmers. A further scheme has been to sell customer a ticket good for $5.00 or $10.00 worth of electricity, and punch off the amount used from time to time.

The Cost of Competitive Systems and Running Cost per KW.H.

In presenting arguments to a farmer customer as to why he should be glad to pay the cost of extending the service, it is well to bear in mind the fact that the cost of small isolated plants of limited capacity is very considerable; thus a well-known maker in Canada lists his machines at the following prices, f.o.b. factory:—

300 Watts	$ 425.00
600 Watts	585.00
850 Watts	815.00
1¼ KW. Plants	925.00
2½ KW. Plants without battery	1,400.00
2½ KW. Plants with batery	2,500.00

These plants, up to 1¼ kw. are for 32 volts, larger sizes 110 volts. The cost of installation, etc., will be a considerable amount and the cheapest plant will not cost much under $600.00 installed for 300 watts.

The running costs of these outfits are given as 9 cents per kw.h. by the manufacturers, but this contemplates steady running, no repairs. When all things are taken into consideration and the fact appreciated that storage batteries are in the hands of unskilled people, it will be found that the cost will be nearer 30 cents per kw.h. than 9 cents.

When it is considered that the Central Station rural line will have behind it plenty of capacity, no operating troubles, service on tap at all times, and at an economical voltage for which standard appliances can be obtained at the lowest prices, there is every argument in favor of the farmer spending just as much money on a transmission line as he will put into a liability such as an isolated plant is.

Your Company believes that where it is impossible to connect up a farmer, from a point of view of the present cost, that the sale of an isolated equipment is a good policy. Once a farming customer has used electric service he will not be satisfied with anything else. Various cases are known where immediately Central Station service is available isolated plants are shut down, and a recent case is reported where six users of isolated plants clubbed together and paid the cost of the extension to meet the Central Station Company line.

Cheapening of Construction, Reference to Underground Work in Ontario

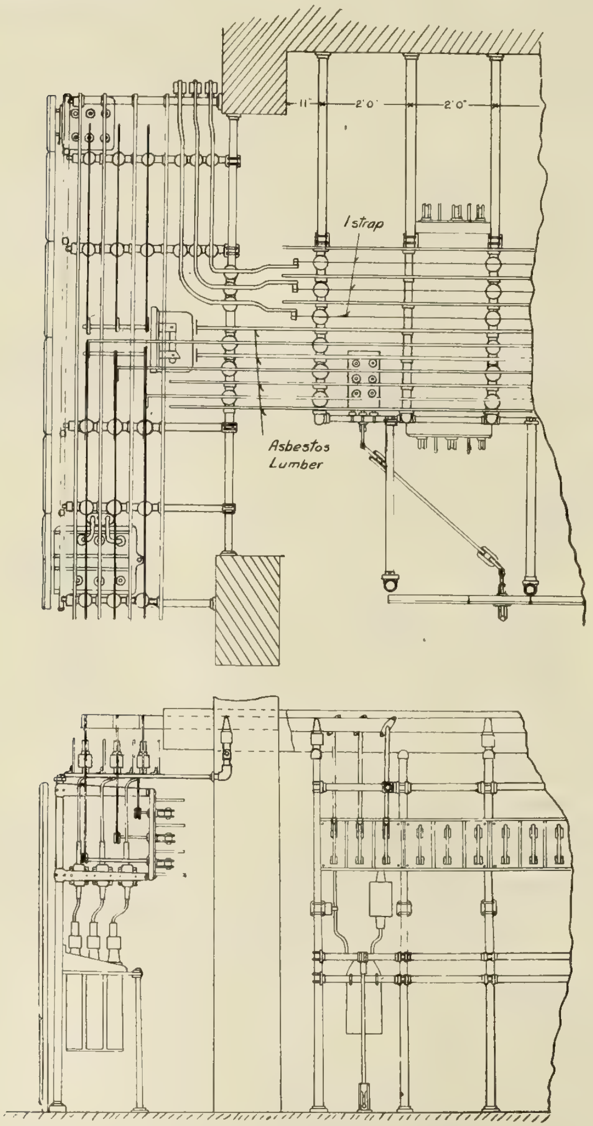
In order to bring more of the farming business into the economically possible class, it is desirable that cheaper methods of construction of rural lines be developed. This

(Concluded on page 54)

Enlarging the Brantford Hydro Station

Some Unique Features in an Installation Where Maximum Capacity in Minimum Space was the Main Problem

The equipment which was originally installed in the Brantford hydro-electric sub-station was thought to be of sufficient capacity for some years to come. Here, as elsewhere, however, the demand for electric power grew at a rapid rate and during the first five years that power was supplied it became evident that the first installation would not supply the demand. The result has been that there have been two additions made to the original building, giving sufficient capacity.



Feeder Board Layout, Plan and Section

The original station had room for three 750 kv.a. transformers. Later, the street railway was taken over and this necessiated the addition of two more 750 kv.a. transformers and three 200 kw. motor-generators. The housing of these was provided for by the building of the first addition to the original station.

Industrial demands made themselves felt in the gradual absorption of the installed capacity. In 1920 the situation was such that it was decided to build a second addition, providing space for six 1,500 kv.a. transformers.

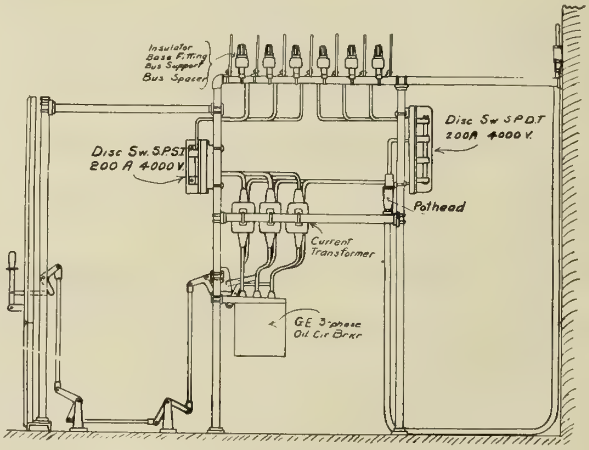
Transformers and Feeder Board

The drawing which is reproduced herewith gives the layout of the switchboard, switching equipment and transformer connections, as now constituted. At the present time there is one 1,500 kv.a. transformer, the remainder being 750 kv.a. The transformers are so mounted on platforms with rails that when they are eventually replaced with the larger capacity (1,500 kv.a.) they will be readily removable. A twenty ton capacty tackle will handle this job. The transformer control panels are placed in the transformer room at the end of the feeder board.

An unique example of a well planned installation is given in the accompanying photograph of the remodelled feeder board. The new scheme is based on somewhat the same general plan as the old one with improvements in the layout. One of the defects of the original board was that the spacing of bus, current transformers, etc., was too close and with the then transformer capacity and ever increasing load, and relay settings on the 26,000 volt going higher, a rupture would have been a serious matter. The new board was designed with these facts in mind and the photos and drawings tell the story. Previously the feeder oil breakers were mounted on sixteen inch panels and the entire board was placed about 8 feet from the wall. Now all the feeders have twenty-four inch spacings and it is possible to use breakers of considerably larger capacity than was possible with the sixteen inch spacing.

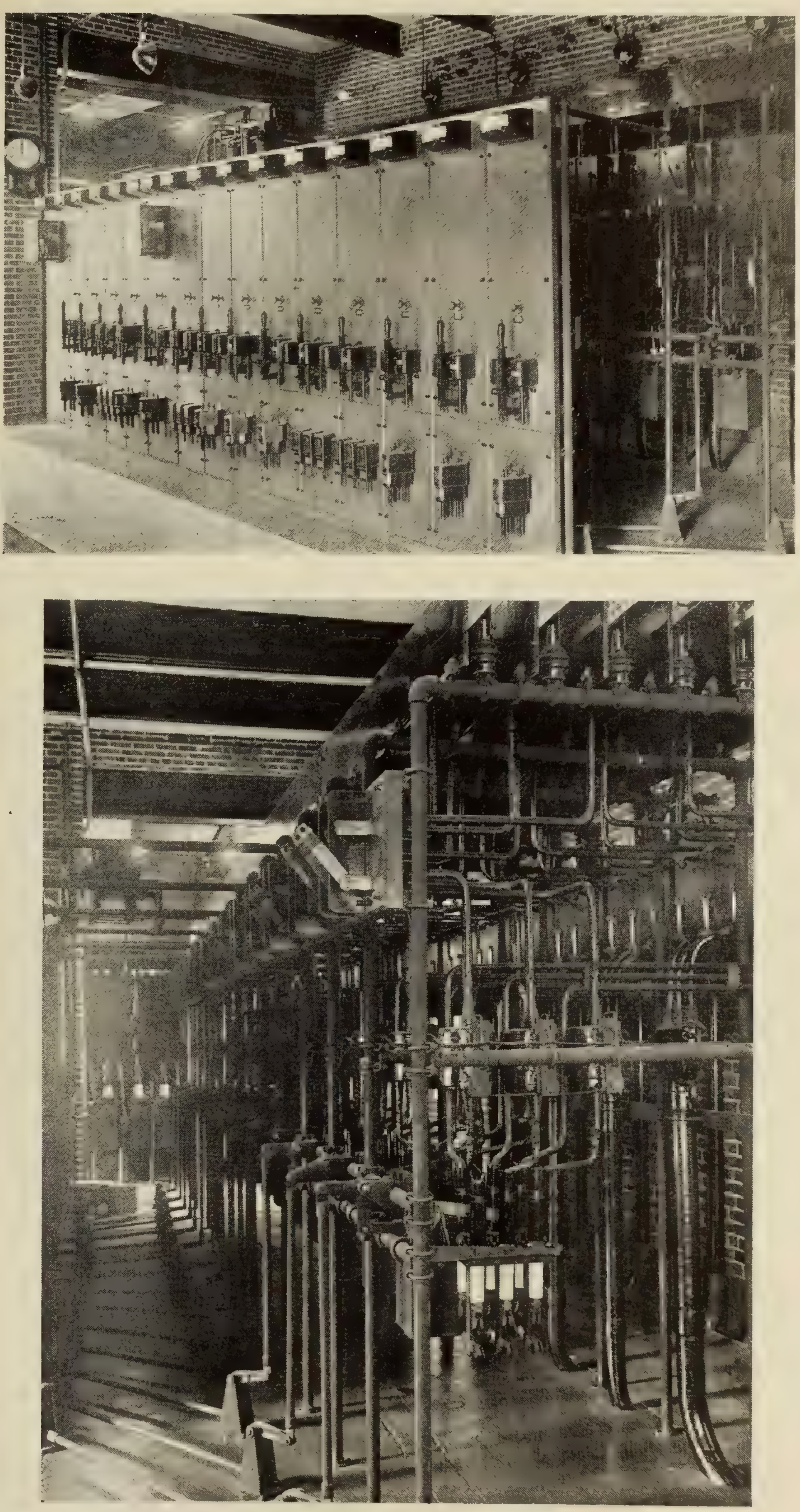
Auxiliary Bus is Very Useful

An auxiliary bus was installed in connection with the feeder system. This provides a number of possibilities that make it a very handy piece of apparatus. For instance, it was desired to tie a lighting feeder on to a power feeder while increasing the size of the copper on the lighting feeder. This could not be done because the current transformer capacity on the power feeder was too low. The difficulty was overcome by using the auxiliary bus which has 300 ampere capacity on 4,000 volts. Another feature of having an auxiliary bus is that it is possible to work on replacement and repairs of any feeder at any time without making an interruption. It is also possible to put a graphic meter on the auxiliary bus and get charts of any outgoing feeder.

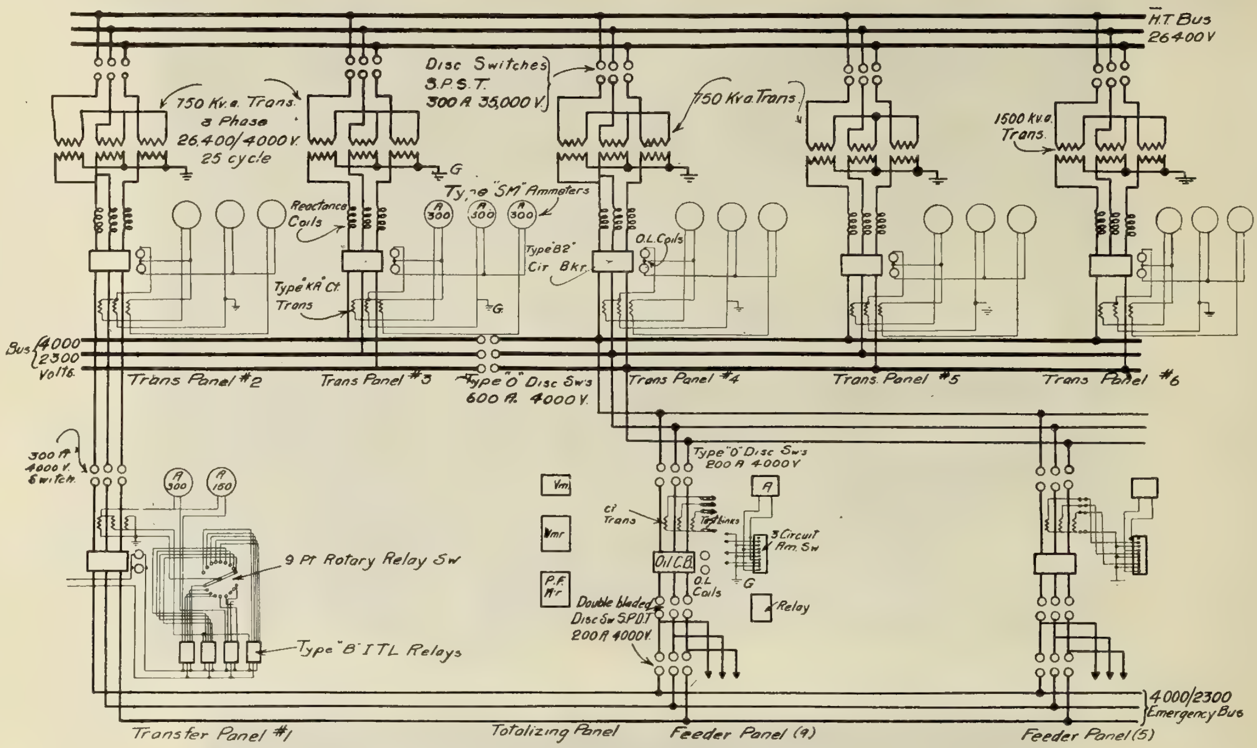


Arrangement of Circuit Breaker and Bus-bars

The method of changing over a load to the auxiliary bus is to close the top disconnecting switches on the double throw panels at the back. The auxiliary bus oil switch is then closed, paralleling the oil breakers. The feeder breakers are then opened and if work is to be done on the feeder



Above—Front view of the new feeder board of the Brantford Hydro-electric System; 15 twenty-four inch panels. Below—Back view of the feeder board. Plenty of room for each breaker and sufficient clearance at rear. Conductors supported on Type "H" insulators and fittings and separated by asbestos lumber



Transformer and Switching Equipment Diagram—Brantford Hydro-electric System

apparatus the bottom disconnecting switches on the double throw panels are opened and also the disconnecting switches on the single throw panels. This isolates the entire feeder control equipment.

The panel shown at the extreme end of the photograph is the totalizing panel which is not yet completed. It will eventually carry graphic instruments as well as all the relay equipment for the operation of the 26,000 volt incoming lines.

The entire equipment was laid out by the local superintendent, Mr. W. P. Catton, and installed under his supervision by the Canadian Westinghouse Company.

They Said "No" But They Bought Just the Same

When a prospect says "no" she does not necessarily mean it. Dealers and salesmen would do well to remember that simple truth.

There are various ways of getting an affirmative decision from a prospect even after she has said "no." Sometimes it takes one or more return calls—but the chances are very much in the salesman's favor, almost invariably.

One woman said "no" because she felt she didn't have the money. Instead of taking away the appliance he was demonstrating, the salesman left it and called immediately on a user who was a neighbor of the first woman and enlisted her co-operation. As a result, the second call a day or two later resulted in a sale. This case also illustrates the value of the oft-repeated suggestion to "use the user."

The other case where the prospect said "no" had as its background the woman's unwillingness to purchase without her husband's consent. The salesman made it a point to call on the husband at his place of business, sold him the idea, and then called back at the home a few days later. Conversations had undoubtedly taken place between the husband and wife in the meantime, because the sale was closed in short order.—Hoovergrams.

Radio Sales Increasing

Recent reports indicate that a large number of new radio companies are being incorporated. There have been reports to the effect that the patents of some of the older companies have been infringed but so far there has been no action taken in the matter. Surely, there will be a day of reckoning but as yet it is afar off. A good idea of the activity in this line is furnished from the knowledge that licenses are being taken out by newspapers and others who had no connection with the game before.

In regard to the type of set that will be used, it is said that unless the number of broadcasting stations increases so greatly that there is one within 25 miles of every home in the populous districts of the country, the sale of crystal sets ranging in cost from $15 to $40 and receiving only up to 25 miles will not be practical. It is believed that the higher-priced vacuum tube and amplifying sets, ranging in price from $75 upward, will be most in demand.

Two projects that it has been stated will involve the expenditure of over $1,300,000, have been commenced by the B.C. Electric Railway, one being the construction of a new 640-ft., dam and the rebuilding of the present dam at Stave Lake, permitting the addition of a fourth power unit, to cost $1,250,000, and the other being the extension of the Broadway West line, in the city, to cost some $75,000. Already over 200 men are at work on the Stave Lake job and a big gang is being put on the street car line extension.

Mr. Norman H. Spreight, of Georgetown, Ont., has recently opened an electrical appliance store in that town and is carrying a complete line of electrical appliances, including "Miss Simplicity" electric washers, National ranges, Sweeper-Vac cleaners; also radio equipment. Although Mr. Spreight has been in business but a short time, he has been very successful and plans to secure a much larger store in the near future.

BETTER MERCHANDISING

Valuable Report of Merchandising Committee of C. E. A.—Knowing Cost of Doing Business—Central Stations as Merchants—A Typical Sales Letter

By R. L. ATCHISON

During the last year we have gone through a rather strenuous period in the sale of Electrical Merchandise, due to the unsettled conditions which have affected the country throughout. Conditions would now appear, however, to indicate that we have "turned the corner," and that we may look for a general improvement in business. This may not develop as rapidly as might be wished for, but it will have the virtue of tending to a more substantial and steady growth. Unemployment is decreasing, labor conditions are more settled, and the dollar is climbing back to its real value. We should, therefore, be able to view the future of the sale of electrical merchandise, which offers vast possibilities, with much optimism.

Our main problem seems to be that of "Selling the Idea," and creating the desire for electrical labor saving appliances and other merchandise. We have made quite substantial progress along these lines, but still have a great deal of hard work ahead, as many people are yet practically ignorant of what the use of electrical appliances and other merchandise means, both commercially and in the home.

There are several different methods by which this can be carried out; all of which help considerably in educating the public to the need for electrical merchandise; of these, newspaper advertising plays no small part, if properly handled; a co-operative campaign of newspaper advertising by the different electrical interests throughout the country would be of great benefit. A campaign along somewhat similar lines is now being conducted in the United States by the vacuum cleaner manufacturers.

Store demonstrations, exhibits at the many Fairs conducted in all parts of the country and installations in domestic science schools are also very good mediums of education.

Generally speaking, at present, we have very few items of electrical merchandise which can be classed as "over the counter" merchandise. Our problem is, therefore, to educate the public to the need of our merchandise, and we will then have a different state of affairs than now exists. We can then reasonably expect the public to come to our stores to purchase our merchandise, as they now do in many other lines, such as hardware, furniture, etc.

Cost of Doing Business

In recognizing this fact it naturally follows that the selling expenses from a retail standpoint must necessarily be very high, as many of our appliances must be sold on a "specialty" basis, such as cash registers and adding machines. The average cost of doing business in the merchandising of electrical appliances and supplies is approximately 26 per cent on the selling price.

The figure may appear high but it can be largely accounted for by the high selling expense involved; a figure of 10 per cent. as a minimum being approximately the amount paid to the salesmen as their compensation, leaves only 16 per cent. to take care of expense involved in demonstration of appliances in customer's homes, which is practically a necessity to secure the sale, and such expenses as delivery, rent, heat, interest, taxes, together with the return which should naturally be expected on the capital invested.

Electric Store Profits

It is a more or less recognized fact that at present the electrical merchandising field does not offer a very attractive return on the capital invested, on account of the high cost of doing business, compared to the prices received for our commodities, many of which prices, particularly in the case of appliances and featured articles are being set by the manufacturers. This obviously, would appear to be a very important question for the manufacturers, jobbers, contractor-dealers, and central stations to get together on, and determine the conditions under which an improvement can be effected.

Additional capital would then be attracted, which would result in the growth being stimulated, which would prove of great benefit to all in the industry, as our business to a large extent is on the basis of "what helps one helps all."

In this connection it is quite gratifying to note many co-operative associations being organized throughout the country and through which we may hope to solve many of our problems through this "get together" spirit.

Sales campaigns, when properly conducted, supplemented by advertising generally bring very good results; one of the great difficulties in conducting a campaign is to secure competent salesmen who are sufficiently familiar with our line to get the message across and secure the business.

Sale Campaign on Ranges

It might be interesting to know that one of our member companies is now conducting a sales campaign on electric ranges, on which terms of payment have been extended to two years, with only an initial payment of $10.00 required. A circular letter explaining the proposition is mailed to a selected list of prospects and these are then followed up by a call from either a salesman or the agent in charge.

It is generally admitted that to sell the larger appliances in any volume, payments must be extended, a year generally being the limit. To cover accommodation 10 per cent. is added to the cash price. When appliances or other material are put on this basis a lien form should be signed by the customer stipulating that the appliance or material is the dealer's property, until final payment is made.

Where the dealer may not find it quite convenient to carry the paper involved in extended term payment sales, usually an arrangement can be made with some financial company to carry this at approximately 7 per cent., and advance the dealer the major part of the money involved in each sale, thereby enabling him to use this capital to good advantage.

Extended terms of payment have also been allowed on house wiring, with very good results. Frequently the contractor-dealer can effect an arrangement with the central station to help not only to finance this, but to supplement the contractor-dealer's efforts by a sales campaign conducted along these lines.

Central Stations as Merchandisers

The question has very frequently been raised as to whether a central station should conduct a merchandise business, but it has been proven that where this is conducted on a strictly ethical basis, it must prove of benefit to all those directly and indirectly interested. A greater demand for appliances and supplies is stimulated through the advertising and aggressive sales methods adopted by them, resulting in more business for all concerned. **Where the central station has dropped out of merchandising, experience has shown that contractor-dealers instead of having more business have had a decided falling off in their business.** Every central station is undoubtedly anxious and willing to co-operate in every way with the contractor-dealer, and where the same spirit is returned by the contractor-dealer, results will be mutually beneficial.

In order to conduct their merchandise department on a strictly ethical basis, central stations should charge directly against this department those expenses such as salaries and commissions, rent, interest, insurance, taxes, delivery, inventory adjustments, etc., which are applicable and would necessarily be incurred by any contractor-dealer.

Appliances and other supplies should be sold at list price, adopted by the manufacturers, and all other material on which there are no stipulated re-sale prices, at such prices as will cover overhead charges, and return a profit; thereby enabling the contractor-dealer to conduct his business along similar lines and eliminate any idea of unfair competition on the part of the central station.

A spirit of co-operation along these lines will do much to remove the little misunderstandings that occur, and establish that feeling of confidence which is so essential and beneficial.

If we are to develop the merchandising end of the business as we hope to, it must be conducted by all the different factions in a similar manner to that in which other successful businesses have followed; viz., a recognition of the different functions of each faction, and an appreciation of the benefits which each can be to the other.

Stock Turnover Four Times a Year

To properly conduct an electrical store, a very careful watch should be kept on the purchases and sales, and an endeavor should be made to have a stock turn-over of at least four times per year. Any article which remains in stock longer than six months should be placed on sale at a reduced price, if necessary, in a prominent location in the store, and when disposed of, this class of material should not again be placed in stock. With the small margin of discounts in effect by the different manufacturers, a quick turnover is essential if any profit is to be realized.

In order to enhance the development of the sale of electrical merchandise, we should only sell such merchandise as will render satisfaction and return full value for the money invested by the consumer.

Electrical stores should be kept neat and clean, windows carefully arranged at regular intervals, and appliances and supplies neatly displayed in such a way as to create the interest of a prospective customer. In describing appliances to the prospect, our talk should be in simple terms avoiding the use of technical terms, which only tend to confusion.

Each store should set a definite figure as the amount of business they are endeavoring to attain for the year; this figure being based on the number of customers supplied with power and lighting service in their city or town and surrounding district. The contractor-dealer could doubtless secure this information on which to base his figures from the central station, and then set his figures for the year, figuring that each lighting or power customer is a prospect for merchandise of some kind.

Electrical Cooking

Electric cooking is gaining very rapidly in favor and we feel that a great deal of productive work is being done along these lines. With the low cost of operation, and with the many conveniences and advantages offered, we can naturally expect to see a very rapid growth in the electric range business.

We believe that the manufacturers would be well advised to consider reducing the number of models or different styles of ranges, and in this way not only relieve some of their own burden, but also help the dealer to keep his stock down by only carrying two or three models. This might also help the manufacturers to reduce their costs, and reduce the price both to the dealer and the consumer.

The question of ease of repairs should also have the very careful consideration of the manufacturers. It is very gratifying to note that many improvements along these lines are now being effected, and this will do a great deal towards increasing the popularity of electric cooking.

Making Repairs

To repair an electric range has been very difficult and expensive; certain repairs taking hours to fix, resulting in an extremely high service charge to be borne, either by the central station and contractor-dealer in most cases, or by the customer where the guarantee period has expired. We would submit to the different manufacturers the question of making surface units interchangeable and easily replaced, so that in the event of any trouble with one of these units a woman could make the change herself, without having to call in a service man.

The question of water heating links up very closely with the sale of electric ranges. Several types of heaters are on the market, which are generally giving good satisfaction, but again the question of repairs enters. It is very disturbing for a customer to have a heater burn out after being in operation only one or two years, and then find that the cost of the necessary repairs is close to that of the original price of the heater.

Regarding cost of operation: different rates can be applied which will meet the required conditions, but in order to give good service and keep the cost of operation down to a minimum, every heater should be supplied with sufficient lagging for the tank and piping.

Convenience Outlets

In order to encourage the easy use of appliances, every endeavor should be made to sell the consumer the necessity for convenience outlets. This will not only result in more business for the manufacturers, jobbers and contractor-dealers in supplying and installing the material for these outlets, but in making the use of the appliances more convenient, will result greatly in increased revenue to the central station.

A great deal is being accomplished along these lines in the many electric homes which are being opened to the public, from which they are learning the necessity for adequate wiring and how electrical labor saving appliances will solve many of their housekeeping problems.

Manufacturers' Help

Contractor-dealers and central stations should take advantage of the many circulars, window displays and advertising helps which are offered by the manufacturers. These should be carefully handled, as they represent a very considerable amount of money on the manufacturers' part. Circulars should be carefully distributed to prospects, and where possible, these, together with window displays, should tie in with local newspaper advertising. In supplying circulars the manufacturers should also be prepared to supply these in French, when called for. This would also apply to instruction books or cards on the care and operation of appliances.

Potential Possibilities

We have in Canada at the present time over 700,000 users of electric service, many of whom when properly sold on the idea are immediate prospects for hundreds of dollars of our appliances, and all of whom are prospects for possibly smaller amounts, and in the aggregate representing many millions of dollars. These potential possibilities can be actually realized, if we will establish among ourselves a strong spirit of co-operation and confidence.

A Typical Sales Letter

Dear Madam,—

"Eventually, why not now?" may be well applied to the purchase of an electric range. Electric cooking has so many points of superiority over all other methods that we firmly believe, as these become known, no woman will be satisfied until she has an electric range installed in her kitchen. Cooking is an art in which all women wish to be very proficient, and the electric range is the means by which this can be accomplished. Some of its many advantages are:—

Scientific Methods:

Cooking more delicious, digestible and nourishing food, with assured uniform results at a minimum of time and work.

Joy of Electric Cooking:

Freedom from excessive heat, fumes, sooty utensils, handling of fuel, wearisome, worn-out methods—convenience. Obtaining any desired heat at the touch of the switch—instantly.

Cleanliness:

No smoke, soot.—No discolored walls and woodwork. —No ashes.

Saving in Work:

Elimination of fuel handling—pot scouring; saving in food—much less shrinkage in meats.

Safety:

No danger of fire or explosion—no need for matches.

Cost of Operation:

Extremely moderate—the average monthly bill for over 1,000 of our customers being $4.00 each per month.

We want to count you among our many satisfied users of electric ranges; and are so confident of the very excellent results you will secure that we are prepared to make you an offer to place a range in your home on two weeks' trial. If, at the end of that time it has not accomplished all we have claimed, we will remove it without any cost to you.

If you desire, as we believe you will, to keep it, you may either pay us within thirty days, or extend payments on a monthly basis over any period up to two years, at a nominal increase over the cash price. On this latter basis, only the very small initial payment of $10.00 is called for, and further monthly payment of approximately $5.00 to $8.00, depending upon style chosen, until final payment is made.

In view of an order for a large quantity of electric ranges, we have been able to purchase these from the manufacturers at a considerable saving, and are, therefore, able to pass this benefit on to our customers in the form of very attractive prices, ranging on a cash basis from $75.00 to $135.00 with a nominal increase in these prices for extended terms of payment.

We believe you will agree with us that this is an exceptionally attractive offer, and that it is to your advantage to place your order now. We expect a very heavy demand, judging from our inquiries, and the ranges will be installed in the order in which instructions are received. The hot weather will soon be upon us, so why not place your order **now,** and enjoy all the conveniences and advantages from the start.

We will be very pleased to have one of our representatives call on you, and give any information you may desire; or we will consider it a pleasure to have you visit our store, and choose the style of range you desire.

All that is necessary for you to do, if you accept our offer or require further information, is to telephone or visit our office or write, and we are at your service.

Yours truly,
Southern Canada Power Co, Limited.

Financing Dealers' Time Payment Sales

The sales-stimulating value of the so-called "time payment plan" in the marketing of the larger household devices is becoming well established. Many manufacturers of such articles have followed the policy of going directly to the householder without the intervention of any middleman, and the extent to which they have offered to sell the device on partial payments has resulted in the establishment of such terms as a recognized practice.

However, the electrical appliance dealer is in closer contact with the user than is any manufacturer, and is the logical medium through which to reach the customer, but he has been prevented from following the time payment practice, due to the fact that it ties up capital during the entire life of such an account—capital that he cannot afford to do without for such a long period of time. Hence this profitable sales field is practically closed to him except in so far as he can induce his customers to purchase on ordinary terms. The dealer, therefore, has not taken the place in the scheme of distribution of such devices that his contact with the users entitles him to.

Many financing plans have been offered, but invariably by concerns whose whole object it was to make a profit on the financing itself, and with no regard to the sale of the appliance except as increased sales might affect their ability to earn increased profits. The insistent demand for a plan conceived from a sales standpoint, and particularly in the electrical household appliance field, has called into being an organization called the Canadian Contract Purchase Company, Limited, to function on behalf of the Canadian General Electric Company and certain other manufacturers who have recognized this need and have taken these measures to supply it.

In setting up the plan, **the sales value to the dealer of the continuous contact with his customer has been preserved.** The manufacturer selling his device directly to the consumer on the time payment plan is not in a position to take advantage of this element in it.

Under the terms of purchase of a household device, payments are made at the dealer's place of business, thus occasioning continuous visits to the store so long as the account remains open; and on every occasion the purchaser becomes a potential customer of the dealer on other merchandise, especially if the device that has been sold on the time payment plan is functioning satisfactorily and the dealer's service and treatment are such as to create a friendly feeling between them. The larger the number of such accounts, the more valuable is what might be termed the "franchise" thus created.

There is a widespread fallacy that the chance of loss through bad accounts of this character is great. The facts are that the losses from this source when compared with the volume of business done are nominal. The average charge customer is largely a moral risk it is true, and the security back of the account is the character and paying record of the debtor, and frequently information on these points is difficult to obtain; if the credit man or dealer is misled or makes an error of judgment, the result is a loss with no recourse toward recovery. However, the sales, under consideration are invariably made on a signed contract, one of the conditions of which is that the title will be retained in the seller until the article is fully paid for; default in any one payment matures all of the remaining ones and entitles the seller to repossession. These contracts are in effect chattel mortgages, but do not meet with the objections that accrue to chattel mortgages, on account of the simplicity with which they are drawn and the fact that they are considered an integral part of the selling plan itself.

A brief review of the Canadian Contract Purchase Company's plan of assisting the dealer and thereby stimulating the sale of the devices, may be of interest

It is a common and justifiable practice to add a differential between the cash and time payment price, to cover the cost and trouble of carrying the account. This added differential is frequently 10 per cent or more of the cash sale price. The price being set, the dealer makes the sale on time and retains whatever "down payment" he receives from the customer—the larger the better, as the more the customer has invested in the device, the more certainty there is that the payments will not be defaulted. The Canadian Contract Purchase Company buys the account from the dealer at a rate of discount determined by the length of the time payment period, the maximum being twelve months, and the rate of discount as follows: four months or less, 14 per cent; five months, 14½ per cent; six months, 15 per cent; seven months, 15½ per cent; eight months, 16 per cent; nine months, 16½ per cent; ten months, 17 per cent; eleven months, 17½ per cent; twelve months, 18 per cent.

The customer is not to be notified of the fact that the account has been sold, but on the other hand this account is left with the dealer for collection, thus retaining the sales contact previously noted.

When the account has been fully satisfied, the dealer is paid a commission equal to 10 per cent, for his services as collector, and should he induce the customer to settle in advance of the original terms, he is given an added commission of ½ to 1 per cent for each month saved. It will, therefore, be noted that if the dealer charges the customer 10 per cent for the time payment privilege, he makes a slight additional profit on the time sale over the cash sale.

As an illustration: Suppose the cash price of an article is 100; the time price is $110—$10 down and $10 per month. The Canadian Contract Purchase Company buys the $100 account from the dealer, which, paying out in ten months, is purchased at a discount of 17 per cent. The dealer therefore received $83. cash from the Canadian Contract Purchase Company in addition to the $10 received from the customer, making an immediate cash return of $93. Assuming the account to pay out in accordance with its terms, the dealer is paid 10 per cent commission for collecting the $100, making a total of $103 cash return on the time sale as against $100 on the cash sale. There is no service or other charge.

The Canadian Contract Purchase Company does not buy time payment accounts indiscriminately, but only those arising from the sale of electrical appliances produced by manufacturers with whom such arrangements have been made.

Electrical Contractor-Dealers of Ottawa Form Local District Association

The electrical contractors and dealers of Ottawa and the vicinity, took advantage of the visit to Ottawa of Mr. Laurence W. Davis, special representative of the National Association of Electrical Contractors & Dealers, to hold a "get-together" meeting. Mr. Davis had been in attendance at the convention of the Canadian Electrical Association, and, following that, had addressed a combined meeting of the French and English Sections of the Electrical Contractor-dealers' Association, in Montreal, on Monday, the 19th. On Tuesday night he returned to Ottawa, where some 35 contractor-dealers had gathered together, on the joint invitation of the Canadian General Electric Company and the Northern Electric Company. Mr. A. A. Dion, superintendent of the Ottawa Electric Co., presided at the meeting.

Mr. Davis spoke at length on the problems of the contractor-dealer, enlarging more particularly on the importance of a more complete recognition of the extent of overhead expenses. Mr. Davis quoted average figures, gathered from a large number of actual results in the United States, and succeeded in convincing the Ottawa contractor-dealers that, in a number of cases, their ideas of overhead had been entirely too indefinite.

Following Mr. Davis, Mr. K. A. McIntyre outlined the aims of the Ontario Association of Electrical Contractors & Dealers and the plan of organization, explaining how an Ottawa District association would fit into the general plan. As a result, 14 applications to join the Association were handed in immediately, and a District will be formed at once which promises to be the second largest in the province.

Mr. Gilbert Doane, district manager of the Canadian General Electric Company, was appointed temporary chairman, and Mr. Moody, representing Ahearn & Soper, for the Northern Electric Co., temporary secretary, pending organization. The first meeting will be held Monday night, June 26, and every two weeks thereafter.

Little by little the Ontario Association is taking on proportions that will make it a powerful factor in the electrical contracting and merchandising field. The next step, which should be considerably easier, will be the formation of similar associations in the sister provinces; the final formation of a Dominion executive will then be an accomplished fact.

Have Taken on New Lines

The Dominion Engineering Agency, 24 Adelaide St. E., Toronto, have just been appointed representatives in Canada for the Sundh Electric Company, of Newark, N. J. The Sundh Electric Co. are manufacturers of electric controlling devices for both a.c. and d.c. and can furnish any type of industrial control; handling, as well, any propositions for equipment to meet special conditions.

The Dominion Engineering Agency have also been appointed sales agents for Ontario for "Rawplugs." The Hydro rules have eliminated the use of wood plugs for fixing purposes, and it is claimed that rawplugs can be used at even less cost than wood and that they are more satisfactory than expansion shields or lead screw anchors of an equivalent size.

This Agency's interests, in the Montreal district, are now being taken care of by Mr. E. W. Playford, 617 New Birks Building, Montreal.

The Future of "Wireless" Is Filled With Wonderful Possibilities

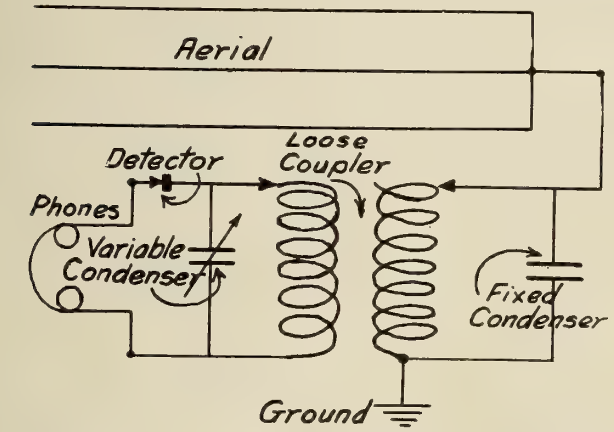
Marconi Says House to House Conversation a Development of the Near Future

The majority of receiving outfits which are used at the present time differ greatly from the single-slide tuner outfit described in our previous article. It is difficult to tune accurately with such an arrangement and there are other troubles such as the reception of the inductive hum of alternating current lines in the vicinity of the antenna. Improvements have been made in every part of the receiving apparatus and it is proposed to describe some of the more widely used arrangements, dealing with such electrical theory as is necessary to explain their use.

Tuning Coils

Accurate tuning is the prime requisite for good results. For this purpose the so-called loose coupler is being largely used at the present time in place of the single slide tuner previously described. One type of this instrument consists of two coils which pull in and out of each other. The primary winding is generally the larger one and the secondary slips inside it. The secondary has more turns and finer wire than the primary. There are many variations in the construction of this type of coil, such as tapping the coils and connecting the different taps to switch points and switches. Sometimes the primary has two switches, one of which tunes a large number of turns per tap, the other being one which tunes perhaps one or two turns for each switch point. Instead of this method sliders may be used on the primary or secondary, or both. The drawing shows a theoretical arrangement.

The rotating coil loose coupler is a somewhat more compact form, in which the primary is rotated past the secondary as a means of varying the magnetic effect between the two coils. The coils should be wound in accurate slotted forms and if otherwise well constructed, give good results.



Condensers

The drawing shows, in addition to the loose coupler, a fixed condenser and a variable condenser, which were not used with the elementary set. The purpose of the condensers is to improve the tuning. They permit a more accurate reception of the signals and allow of the elimination of wave lengths which vary but slightly from the one being received. In the drawing the primary condenser is shown connected across the antenna and ground. This method is applicable to cases where the antenna is short and long wave lengths are to be received. Short wave lengths can be received if the antenna is long and a variable condenser is placed in series with it.

The strength of the signals received can often be increased by the addition of a fixed condenser. This is connected across the telephone receivers. Fixed condensers are generally of small capacity and a common construction embodies alternate sheets of paper and tinfoil.

Tuning and Resonance

It is well known that the cutting of lines of force about one coil, by another, results in a current being produced in the second coil. Under certain conditions more electric energy may be transferred from one circuit to the other, and this condition is known as resonance. The resonant frequency of a circuit is thus dependent on certain electrical features of the circuit, which are called capacity, inductance and resistance.

Inductance is the property of a coil of wire whereby it tends to prevent any change of current through it. Roughly, it increases as the square of the number of turns. Capacity may be roughly defined as the ability of a conductor to hold a charge of electricity. Condensers give capacity, hence their use in the circuit.

In a transmitting circuit there are generally two circuits which are tuned, that is, they are adjusted to have the same resonant frequency. Thus a pure wave of maximum power is radiated. The receiving station is tuned so as to be in resonance with the station it is desired to read. It is obvious that waves are coming in to the aerial from many stations simultaneously. It is only, however, waves of a particular frequency which build up an appreciable current in the tuned circuit, the others, unless very strong, passing through to ground unnoticed.

The drawing which is reproduced with this article represents only one of many ways in which it is possible to hook up such apparatus as is represented. It is safe to assume that the amateur who has progressed so far will not be content to stop at this point. With this in view, an article will be published in the future showing some of the further refinements that can be made.

E. Kootenay Power Company Closes Contract

The East Kootenay Power Company have closed a contract with the Consolidated Mining & Smelting Company to supply power to the Sullivan Mine at Kimberly, B. C., and also for a new concentrator about to be installed at this mine. This contract calls for 3,000 h.p. immediate delivery, and all the requirements of the company up to 8,000 h.p. for a period of ten years.

Mr. Gordon Kribs, formerly assistant engineer with the Hydro-electric Power Commission of Ontario and latterly engaged in the manufacture of the Kribs Electric Washing Machine, has been appointed chief electrical engineer to the New Brunswick Power Commission.

Manitoba Electrical Association Outlines Plans for Coming Year

On Wednesday the 7th June, the representatives of all the big electrical institutions in Winnipeg, met at the Fort Garry Hotel, to discuss ways and means of putting the Manitoba Electrical Association, on a more sound footing and to map out a program for the ensuing year.

A nominating committee comprised of Morris Deering, Lee Dickson, K. N. Forbes, John Whitsell, E. H. Smith, and W. Sibbald, was appointed to draft up a slate of officers and submit the same to the regular meeting of the Association. There was considerable discussion as to what should comprise the functions of the association, and it was the general feeling of those present, that the association should function as a business organization rather than socially.

A vote of thanks was tendered to Jim Swan, manager of the appliance department of the Winnipeg Hydro, who for the past year has been acting as hon. sec. of the association. Jim has done excellent work and is deserving of praise.

J. E. Lowry

The matter of an electrical show and an electrical home demonstration was discussed. It was decided to leave this question over for the new executive to deal with.

Two other members of the association came in for their share of high tribute; Morris Deering, who for the past year has acted as president of the association, has done much to boost the electrical industry; he made an ideal president. The other member in question is H. C. Howard, publicity manager of the Winnipeg Electric Railway Co., "'Bert" has acted in the same capacity for the association during the past year, and has done some really fine work, especially in editing the electrical page in the Manitoba Free Press, which has appeared weekly. A vote of thanks was also tendered to the late executive.

Association Appoints New Officers

At the usual fortnightly luncheon held at the Fort Garry Hotel, Winnipeg, on the 15th June, the following officers were elected for the ensuing year.

President

J. E. Lowry, Commissioner, Manitoba Telephone System.

Executive

M. E. Deering, manager, Northern Electric Co. Ltd., Winnipeg.

Geo. Wright, manager, Canadian General Electric Co. Ltd., Winnipeg.

E. H. Smith, manager, Canadian Westinghouse Co. Ltd., Winnipeg.

John Whitsell, manager, Winnipeg Electric Railway Co.

K. N. Forbes, manager, Canadian Fairbanks Morse Co. Ltd., Winnipeg.

J. Rocchetti, acting Power Commissioner, Province of Manitoba.

E. V. Caton, chief engineer, Winnipeg Hydro.

F. H. Martin, chief engineer, Manitoba Power Co.

L. B. Dickson, manager, McDonald & Willson Lighting Co. Ltd., Winnipeg.

A secretary for the association will be appointed from the Executive at their next meeting.

May Install 25,000 Kv.a. Standby

The Winnipeg Hydro-electric System are considering the erection of a steam standby plant as an auxiliary to their present hydro-electric generating station. Owing to the requirements of many of the consumers of electric power in Winnipeg for an uninterrupted service, the management of the Department have decided that a steam standby plant is necessary. While the interruptions on the transmission line have been very few, still the damage caused by such a storm as that of May 10th, when both the Winnipeg Electric Railway Co., and the city's lines were damaged so as to interrupt the service for some hours, has made it essential that measures be taken to provide for such contingencies. It is proposed to install 2-12,500 kv.a. turbo-generator sets with condensers. The boilers will probably be heated with oil fuel. It is also proposed to install a small electric boiler to keep the fuel feed pipes warm and also to keep one of the turbo sets turning over. Plans and specifications for the equipment are being prepared.

Now Permanent Sales Manager

Jack Wheatcroft, who for the past two or three months has been acting salesmanager for the Great West Electric Co, Ltd., Winnipeg, has now been officially appointed to that position. Mr. Wheatcroft needs no introduction to the electrical industry in the Prairie Provinces, as he has been covering that territory for the past four years for the Great West Electric Co. Jack, as he is popularly known, is a man of good executive ability, and is fitted in every way possible for his new position. A. H. Smith, formally of the Calgary office of the Great West Electric Co. Ltd., will represent the same company as special Laco lamp salesman in the Prairie Provinces, and head of the Lakes territory. He is now in Montreal visiting the factory, and will return to Winnipeg early in July. W. A. Williamson, Laco lamp representative at Winnipeg, has severed his connection with the firm and gone to Chicago.

Joins Mr. Gilman's Staff

R. A. Merritt has just joined the staff of the Winnipeg Electric Railway Co., he will be in M. C. Gilman's department, who is Sales Manager, Electric Utility, Winnipeg Electric Railway. Mr. Merritt was power sales engineer for the Toronto Electric Light Co., from 1910 to 1918, when he left to join the U. S. army. While in the army he had charge of all utilities at Camp Sherman, Chillicothe, Ohio. for the United States army. On entering civil life again Mr. Merritt accepted the position of Supt., of the Lakewood and Coast Electric Co., Lakewood, N. J. He is a graduate of Purdue University, and an electrical, as well as a mechanical engineer.

Magnitude of W. E. R. Business

The Winnipeg Electric Railway Co., claim they are employing more men today than they have for some time past. They are distributing in wages and supplies over $10,000 for each of the 365 days of the year of which amount $7,000 is for wages. In taxes to the City of Winnipeg it contributes $1,000 per day. During the past twelve months these items alone, and they are not all of the expenses of operating the company, ran close to $4,000,000. These figures illustrate the magnitude of the business which the Winnipeg Electric Railway Co., does in Winnipeg.

Electrical Equipment Co.

Oscar Boyd, and S. H. Wright, have opened a retail electrical store at 585 Sargent Ave., Winnipeg, under the name of the Electrical Equipment Co. Both members of the firm are well known in Winnipeg. Mr. Boyd was formerly in business in Winnipeg, under the name of the Winnipeg Engineering Co., for a period of six years. Mr. Wright has been associated with Mr. Boyd for the past four years, previously being the electrician at Stony Mountain Penitentiary.

Miscellaneous

The storm of Sunday June 18th, caused some damage to the distributing transformers of the Winnipeg Hydro-electric System. It is found that the transformers on the 4,000 volt star connected common neutral system, which were protected by choke coils and lighting arrestors, were not damaged. This type of protection has been installed on part of the distributing system and will be the standard as the remainder of distribution is changed over from 3 wire delta to 4 wire star with common neutral.

Work is progressing rapidly on the installation of the 12,000 volt feeders from the terminal station to No. 5 substation of the Winnipeg Hydro-electric System. The laying of the conduit is being done by Messrs. Carter-Halls-Aldinger and it is expected that it will be completed by July 15th.

Purchase of the Walker-Schultz property, located at 425 Henry Ave., Winnipeg, for $120,000 for a storage warehouse for the Winnipeg Hydro, was recommended to the City Council on June 19th, by the public utilities committee; the council referred the matter back to the committee.

Northern Electric Engineering Society Annual Meeting

The second annual meeting of the Northern Electric Engineering Society was held at the society's headquarters on Monday, June 5th, 1922, with a large number of members present. The reports of the various officers and committees for the year were submitted and accepted, it being the general feeling that the society has succeeded in carrying out a very active and interesting programme during the season just ended.

The retiring president, Mr. W. S. Vipond, expressed the society's appreciation of the very valuable assistance rendered by the gentlemen who addressed the meetings during the year, or who otherwise assisted the society in carrying out its programme.

The election of officers for the season 1922-1923 resulted as follows:—

Honorary president, P. F. Sise, re-elected; president, W. S. Vipond, re-elected; vice-president, N. R. Ashley; secretary, A. J. Lawrence; treasurer, L. R. Waller.

In addition to these officials, the following gentlemen were selected as members of the Council, to represent the various branches:—

F. J. Benoy, W. B. Cartmel, J. Shield, J. O. Beaudet, F. H. Alder.

Messrs. Vipond, Ashley, Lawrence and Waller in turn briefly addressed the meeting, expressing their appreciation and their hopes for the society during the coming year. It is the intention of the incoming Council to carry on along similar lines to those followed last year, with a view to aiding in the interchange of engineering and technical information among the engineers of the city and district. Further details concerning this programme will be available at a later date.

Every Electrical Store Should Display a Slogan

Slogans do their work in a subtle, easy way. The prospect hardly knows that he is being influenced. From day to day and week to week, his eye falls upon the familiar words and gradually and unconsciously he becomes imbued with the idea that what they advocate is the only thing.

This painless method of education is not taken advantage of by electrical dealers to the extent that it should be. Not long ago the writer had occasion to visit a number of electrical stores, and he found that **90 per cent. of them had no slogan of any nature whatever on display.** These stores were losing an opportunity—throwing away their chances as if they were worth no more than a basket of ashes!

No one can deny that the public needs to be influenced in this matter of **buying electric goods in an electric store**—if its indifference in this regard can be overcome one of the greatest difficulties in the path of the dealer will be removed. Propaganda should be distributed in every possible way, and the use of slogans is an effective method that costs practically nothing. Every electrical dealer should have one or more on display all the time.

Here are a few that are well known:

Do it Electrically

Buy Electric Goods
in
An Electric Store

Say it Electrically—
Flowers Die!

You Don't Buy
Shoes in a
Grocery Store

A small card, displaying any of the above, will fit into most window sets—a larger one of a more substantial type, would form an arresting outside display. The cost of such signs is nominal and their continued use is bound to produce results.

Vancouver Enjoying Building Activity—Electrical Industry Improving Its Condition

By RAY E. CHATFIELD
Secretary Manager Electric Service League of B.C.

Greater Vancouver is today enjoying greater building activity than during the boom years of 1911 and 1912. Unfortunately, however, this activity following a period of depression in the building trades has created a very serious condition which affects the building public as much, or more than it affects the building trades. The building trades are becoming alive to the condition but unfortunately the public is still blissfully ignorant. During the lull in building activities journeymen electricians, plumbers, plasterers, carpenters, etc., were thrown out of employment. Driven by necessity these journeymen undertook various small repair and construction jobs as contractors, often working for less than half the wages laid down in the union scale. Blame for this, however, can hardly be placed on the individual journeyman or group of journeymen. It was the direct result of economic conditions and an individual, to protect his family, had to work.

The growth in building activities, however, instead of tending to right this unfortunate condition only made bad matters worse. Where there had been one contractor there now were one hundred potential contractors. These inexperienced "journeymen-contractors" "jerry" contractors or curbstoners became a tremendous factor in the building business. With practically no business experience and no knowledge of costs they plunged recklessly into the stream of new business and wrought havoc.

Competition became so keen between these "journeymen-contractors" in all branches of the building trades that contracts were let for cost or even less than cost. The plumber to get a plumbing job, would **attempt** to put in an electric wiring installation at less than cost and vice-versa. Prices were so low that the "journeyman-contractor" was always two or three jobs in arrears with his supply house, and it was absolutely essential that he keep working continuously so that to-day's job would pay for the material used on a job last month, etc.

The general contractor made capital of this condition and played one "journeyman-contractor" against the other until a job was let for less than wages necessary for the labor. Legitimate contracting firms were driven entirely from the field.

The morality of the whole building trade was lowered—buildings were skimped—sub-standard materials were used. Eventually the building public received something for nothing—a job done at a wholly inadequate price and failure stared contractor after contractor in the fact.

The mortality in the building trades grew and the supply houses suffered greatly.

The electrical industry in Vancouver is making the first determined and concerted effort to combat this evil. Under the auspices of the Electrical Service League of British Columbia the problem has been attacked from several angles.

First—the sub-contractor himself.

Second—the architect.

Third—the owner who takes out a building permit.

Meetings of the small electrical contractors who are not members of the Vancouver Association of Electrical Contractors and Dealers, are held every alternate Tuesday and the fieldman gives a blackboard lecture on the proper method of estimating and pricing a job—these meetings have been held for several months and are producing excellent results.

The league has prepared a little pamphlet " The Cost of the Lower Bid" which has been sent to every registered architect in the Province.

This little pamphlet is 3 1/2 x 6 1/4 inches in size, consists of four pages and is an argument for materials of high quality and good workmanship by the **qualified man** and points out the false economy of the lowest bid for house wiring.

In addition this pamphlet is sent to every owner taking out a building permit of $2,500 or over in Greater Voncouver.

By attacking the cut price evil from the three angles of educating the electrical contractor who is attempting to do the work, of pointing out the false economy of the lowest bid to the owner and of emphasizing upon the man who is supposed to supervise and protect his client, the architect, the fact that he **gets exactly what he pays for,** and no more, in a cut-price electrical installation, the Electrical Service League hopes to make some appreciable headway in the raising of standards for the benefit of the public and of the electrical industry

This activity on the part of the electrical industry through the Electrical Service League is creating much favorable comment among the other branches of the building trades and in all likelihood will be followed by similar effort among the other sub-trades in the building industry.

What Would You Do in a Case Like This?

Here is an everyday problem in the electrical business that is typical of what the electrical dealer is up against all the time. Careful handling of such cases is always necessary and this particular one is illustrated for the purpose of obtaining from our readers their ideas of how it should be done:

Mrs. Brown bought some shades from one of our well-known dealers, whom we will call John Smith. It took some trouble to make the sale, as Mrs. Brown is an extremely fussy individual, and John patted himself on the back when he finally disposed of four, particularly because they were the last of a type that had hung on his hands for a long time.

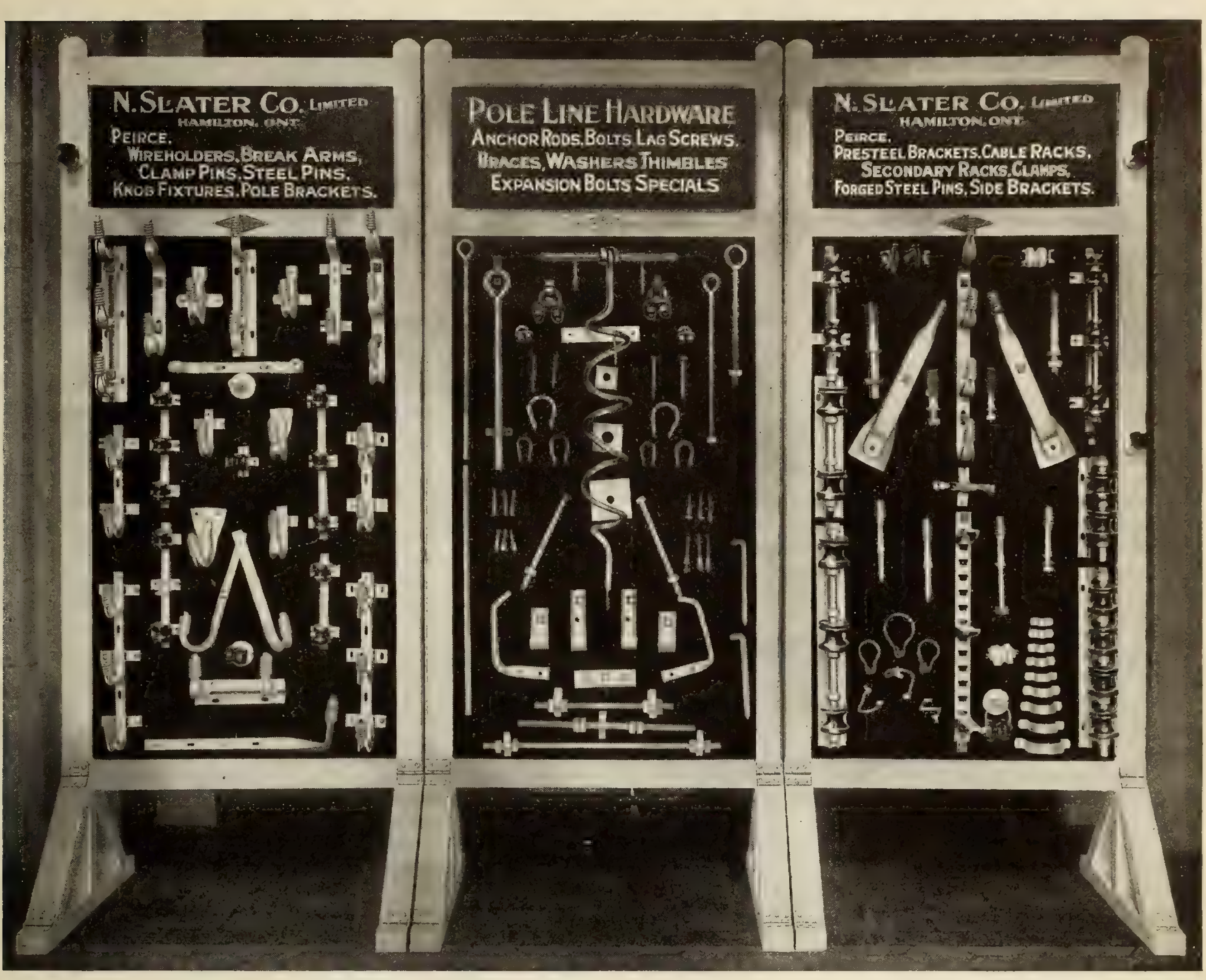
His joy was short-lived, however. Little Tommie Brown came in next day and presented to John a large parcel which when unwrapped, disclosed one broken shade. "The delivery man broke it and mother wants another," he said, and waited expectantly.

That put John in a quandary. He knew that all the shades had started from his store in good shape, and he was fairly sure that the one in question had not been broken in delivery; still, he was not certain about it. Mrs. Brown was not a good customer, but she was a close friend of some of his best.

It might be a wise thing to replace the broken shade, but he had no more on hand. The purchase of a quantity of this type, which he had found unsaleable, did not appeal to him.

What is the best thing for John Smith to do?

The Mechanics' Supply Co,, of Quebec, announce that they have secured the services of Mr. G. Lorne Wiggs, B.Sc., who since his graduation from McGill University, has had a thorough practical and technical training in electrical engineering, which will be of great service to the company's clients.



Attractive Exhibit of Pole Line Hardware at C.E.A. and A.M.E.U. Conventions

A Notable Exhibit at the June Convention

The exhibit of Peirce pole line hardware shown at the Canadian Electrical Association held at Ottawa, June 15th, 17th and at the Niagara Convention of the Association of Municipal Electrical Utilities held June 22nd to 24th, created considerable comment. The exhibit in itself was quite novel, but as strictly Canadian products they were much appreciated. Peirce brackets have been prominently before engineers ever since the inception of exhibits by the Commercial Section of the A.M.E.U., having been consistently exhibited at all the conventions. This year the "quality" pole line hardware displayed upon the dark green ground of the boards was particularly pleasing. The large corkscrew on the centre board came in for special attention. This particular article was made obsolete by the O.T.A. in October, 1916: but still as a relic and reminder it was interesting. Seriously, however, it clearly shows the quality of material out of which the anchor rods and all Peirce pole line hardware are made. This company is to be congratulated on its enterprise.

Inventions Limited are distributing an attractive booklet on rawlplugs. The booklet describes the various uses to which these may be put, with a variety of interesting illustrations, and closes with opinions of architects, builders, electricians, etc., who have had practical experience in the use of rawlplugs.

The Cost of the Lowest Bid

The electrical equipment of a home to-day, no matter how simple that home may be, is a scientific problem and warrants a few minutes attention and study.

Electricity is constantly making life easier, more convenient and more comfortable for everybody and, as the world is grasping the place of electricity in the home, soon it will be the exception for a house not to be thoroughly equipped for every phase of electrical service.

Considering the importance of the electrical equipment of the home, nothing should be left to chance. The wiring should be right, the illumination properly provided for, electrical outlets conveniently placed and the materials and appliances should be what experts have decided is necessary for a safe, dependable and permanent job. In other words, your equipment ought to be standard.

Your electrical installation requires a specialized knowledge just the same as your heating or plumbing installation. The heating engineer or the sanitary engineer knows better than you do what your house requires. In these cases, if you are wise, you select a man whom you know to be qualified in every respect to give you a satisfactory installation at a fair price.

There has to be a man who **knows,** and the community has to have some means to find him. The man who knows electricity, so far as it applies to the modern household, is the **qualified** electrical contractor, who is in close touch with the latest developments in the electrical field, who employs good workmanship, uses standard materials and charges fair prices.

Nowhere is responsibility and technical competence of more importance than in the electrical field. Cut-rate, irresponsible electrical contracting service is always expensive and frequently disastrous. You seldom save more than one half of one per cent on the bid ($50.00 on a $10,000 house), and you are likely to spend five times that amount in replacing poor workmanship and sub-standard materials and in supplying the needed " convenience outlets" and wall switches whose omission made the bid possible.

The economy of the lowest bid is nowhere so false nor does it exact such heavy penalties as in electrical contracting service. You get exactly what you pay for.

The use of materials of quality and high standards will in a large measure determine the reliability and integrity of the electrical contractor.

You may look to him for advice on the location and installation of electrical convenience outlets rather than cut out these necessary features of your home for the sake of underbidding a competitor. You may safely rely upon him to provide your home with proper illumination based upon the floor area, utility and decorative features of your rooms rather than sell you fixtures upon which he will obtain the biggest profit.

In addition to buying the wiring services of the qualified electrical contractor, you will also be buying his technical skill and scientific knowledge acquired by keeping thoroughly in touch with the latest developments in his business.

The plumbing of a house generally costs about 13 per cent of the total cost; a fair basis for judging the quality and completeness of the electrical wiring, excluding fixtures, of the home has been set at 5 per cent. How does this compare with your estimate?

The home you build today is expected to remain modern for ten, fifteen years or perhaps longer. With the progress that is being made today in the electrical equipment of a home, nothing but the latest and most complete features will be economical.

It will pay in the end to give your work to a thoroughly reliable contractor, to seek and rely upon his advice and judgment and to demand completeness and quality rather than cheapness of work.

Bridging the Gap Between City and Country

(Continued from page 40)

is a problem for the Overhead Lines Committee to study.

One company is using single iron pins screwed into the pole in place of cross arms, which has resulted in a very considerable decrease in the cost of framing the poles.

The Ontario Hydro-Electric Commission is trying a new type of construction, viz., the use of single conductor, rubber insulated, lead covered, 2,200-volt cable, laid directly in the ground about 18 inches deep, plowed in. The system in use is 4,000 volts, 3 phase, 4 wire, with a grounded neutral. The main trunk lines are composed of three single cables bonded together, using the lead as the fourth wire, and single phase taps are run with one cable, using the lead as a return. This construction is reported as being cheaper than pole lines; all transformers are mounted on poles and the cable run up the pole. These transformer poles act as junction poles, so that the average distance between exposed points on the underground cable is only 500 feet.

One hundred miles of this construction is going into operation this Summer, and its operating performance will be a valuable study.

From the above, it will be noted that your Committee is making a report that is more or less a warning to Member Companies to carefully consider rural business before going into it extensively. The main problem is to develop the uses of electricity, so that the farming customer can economically supplant other methods of obtaining present results by electrical methods, and in doing so, use at least $200.00 worth of electricity per annum without creating a heavy demand.

Wisconsin Farm-owned Lines Show a Deficit

An interesting and significant study of the losses in the rural distribution of electrical energy was presented at the recent meeting of the Wisconsin Utilities Association at Milwaukee. The data are for lines that are owned by the farmers and are significant because they are taken from the files of the Railroad Commission. Deficits running all the way from $18.00 to nearly $68.00 per consumer are shown. The figures are of particular interest to central-station men who must combat the farmers' idea that the central-station company is making a mint of money out of the service. Not only has the revenue not paid a return on the investment, but depreciation has not been covered in any of the cases, and in some of them the revenue has not covered the current operating expenses. The figures should be valuable to any central-station operator who must handle rural distribution business.

Cooking is one of the most desirable loads, and when new extensions are under consideration, if the farming customers can be induced to buy ranges, an extra $50.00 per annum at least can be expected. With the gradual depletion of wood around the farms, cooking will have to be done by some other methods, and electricity is more economical than oil or coal.

On an extension made last year in the States of 2 3/4 miles in length, thirty out of thirty-six customers took electric ranges, and as a result the average income per customer has worked out at $80.80, for 1760 kw. hrs. This is a step in the right direction, and it is on these lines that the farming business can be looked forward to as good business instead of being otherwise.

Exhibits at C. E. A. Convention

The number of exhibits at the C.E.A. convention was small but the displays were all extremely interesting. These included the Lincoln Meter Co., R. N. Slater Co., and the Standard Underground Cable Co. Interesting exhibits were also shown by the Accident Prevention Committee, the Overhead Systems Committee, the Underground Systems Committee, and the Rural Lines Committee.

Mr. G. W. Barber, for the past twelve years with McDonald & Willson, Limited, Toronto, has resigned to become managing director of Electric Lighting Products, Ltd., a newly formed wholesale fixture house of that city.

The British Engineering Standards Association have just issued two interesting bulletins, the first, No. 108, entitled "British Standard Graphical Symbols for Electrical Purposes"; the other, No. 128, entitled "British Standard Specifications for Dimensions and Resistances of bare annealed wire for electrical machinery and apparatus."

"Tricable" Used in Electric Home

In our issue of June 15 we described the wiring of the Electric Home in Hamilton, Ont., and used the expression "The house was wired throughout with BX cable." This was an oversight on our part; the cable used was the armoured cable known by the trade name "Tricable." It is manufactured in Canada by the Canadian Triangle Conduit Company, at their factory in Toronto.

Current News and Notes

Barrie, Ont.

Mr. Wm. Bishop has secured the contract for the electrical work involved in the repairs being carried out to a business block on Dunlop St., Barrie, owned by Mr. Frank Jackson.

Brandon, Man.

G. T. Smith, 862-7th St., Brandon, Man., has recently entered the electrical contracting business.

George Hinners, electrical contractor and dealer, of 32-9th St., Brandon, Man., has been awarded the contract for electrical work required in the reconstruction of the Crescent Creamery Co., Brandon.

The Boyd Electrical Co., Limited, of Brandon, Man., was recently awarded a contract by the L. R. Steele Co., Rosser Ave., Brandon, for wiring, lighting fixtures and a 5 horse power motor and transformer, for cold storage purposes.

Brantford, Ont.

One-man street cars have recently been put in operation in Brantford. The entire system will eventually be put on the one-man basis, it is stated.

Burlington, Ont.

Messrs. Culley & Breay, 35 King St. W., Hamilton, Ont., have secured the electrical contract on a Sunday School building to be erected at Burlington, Ont., at an estimated cost of $22,000, for St. Lukes Anglican Church, Burlington.

Calgary, Alta.

Damage by fire to the extent of about $3,000 was recently done to the city's sub-station, located near Bowness Park.

Canso, N. S.

The Postal Telegraph Commercial Cables System has bought from the Government of Newfoundland the submarine cable from Canso, N.S., to Newfoundland.

Cornwall, Ont.

Mr. Stan. Lewis, 63 Metcalfe St., Ottawa, has been awarded the contract for electrical work on a $75,000 school being erected at Cornwall, Ont.

Dixie, Ont.

Messrs. Harris & Marson, 81A Parkway Ave., Toronto, have been awarded the electrical contract on a school building to be erected at Dixie, Ont., at an estimated cost of $45,000, by the trustees of S.S. No. 1, Toronto Township.

Hamilton, Ont.

Mr. L. H. Lander, King E., Hamilton, has been awarded the electrical contract on store and apartments, valued at $20,000 being erected on Ottawa & Argyle Sts., Hamilton.

Hanna, Alta.

The ratepayers of the town of Hanna, Alta., recently voted favorably on a by-law authorizing expenditures for the installation of an electric lighting plant.

Kitchener, Ont.

Mr. Harold C. Kress, 95 College St., Kitchener, Ont., has secured the electrical contract on a $30,000 parish hall being erected on Queen St. N., Kitchener, for St. Peters Lutheran Church.

London, Ont.

The Canadian General Electric Company has secured the contract for two 1,500 kw. transformers for the Public Utilities Commission of London, Ontario.

Moncton, N. B.

Mr. E. LeBlanc, Church St., Moncton, has secured the electrical contract on a $6,500 residence being erected on Enterprise St., Moncton.

Mr. Wm. G. Crowley, 281 George St., Moncton, hes been awarded the electrical contract on a residence being erected on Archibald St., for Pat Larracey, of Archibald St.

Mr. J. W. McCarthy, 202 St. George St., Moncton, has been awarded the electrical contract on an $80,000 school being erected on Wesley & Queen Sts., for the R. C. School Commission.

Montreal, Que.

Mr. M. Martel, has secured the electrical contract on a store and 5 flats, being built on the corner of Oxford & Sherbrooke Sts., at a cost of $21,000, for Mr. Burland.

The electrical work on the repairs to a $10,000 residence on Durocher St., Montreal, owned by the Catholic High School, has been secured by the Vincent & Say Electric Co.

Messrs. J. A. Anderson & Co., 205 Mansfield St., Montreal, have been awarded the electrical contract on an $11,000 garage being erected on Vallee & St. George Sts., for the Coca Cola Co.

The Sayer Electric Co., 47 Bleury St., Montreal, has secured the electrical contract on a bank building located at Bleury & St. Catherine Sts., Montreal, now being remodelled for the Dominion Bank of Canada.

Mr. J. A. St. Amour, 2171 St. Dennis St., Montreal, has secured the electrical contract on an apartment house to be erected on Dorchester St., near St. Mathieu, Montreal, at an estimated cost of $125,000, by Messrs. F. Tremblay & Company, 400 William St.

Ottawa, Ont.

The Bank Electric Co., Bank St., has been awarded the electrical contract on a residence costing $8,000 being erected on Clarence St., for Wolf Shenkman.

Mr. Wm. Hoffman, Westboro P. Q., has been awarded the electrical contract on three residences, value $13,000, being erected on McLeod St., for R. Maxwell, Ottawa.

The electrical contract on a residence being erected on Bronson Ave., Ottawa, for R. W. White, 992 Bronson Ave., has been awarded to Mr. Davis, LeBreton St., Ottawa.

Mr. Fred Wilson, 128 McLeod St., Ottawa, Ont., has been awarded the contract for electrical work on a church to be erected at Bell & Somerset Sts., Ottawa, by St. Lukes Anglican Church, costing in the neighborhood of $50,000.

Rockland, Ont.

Work has just been started on an electric lighting system and dam for the Rockland Electric Light Co. The cost is estimated at $55,000.

Rockcliffe, Ont.

Mr. Stan. Lewis, 63 Metcalfe St., Ottawa, has been awarded the electrical contract on a $15,000 residence being erected in Rockliffe, Ont., for A. S. Sherwood.

St. Thomas, Ont.

The annual report of the St. Thomas Municipal Hydro-electric Department shows a surplus of $22,615. An amount equal to one month's bill was handed back to each customer from the accumulated surplus.

St. Lamberts, Que.

Mr. F. Matthews, 52 Elm St., St. Lamberts, Que., has just secured the contract for electrical wiring on a new residence recently erected for Mr. L. Juster, Birch Ave., St. Lamberts. Mr. Lambert also reports the installation of a number of electric ranges in different sections of the city.

St. Catharines, Ont.

Mr. F. Carley, 19 Jones St., St. Catharines, Ont., has been awarded the contract for electrical work on stores, office and lodge building, recently erected at 18 James St., St. Catharines, for Union Lodge I.O.O.F. No. 16, at an approximate cost of $70,000.

Sarnia, Ont.

The Chambers Electric Co., Sarnia, Ont., has been awarded the electrical contract on a church hall to be erected on George St., Sarnia, for the Central Methodist Church, at an estimated cost of $30,000.

Saskatoon, Sask.

The Electric Shop, Saskatoon, Sask., has secured the electrical contract on a College and School Home being erected on College St., Saskatoon, for the Presbyterian College, Saskatoon.

Sudbury, Ont.

Messrs. Grant & Hiscock, Sudbury, Ont., have been awarded the contract for electrical work on a parish hall to be erected on Ignatius St., Sudbury, for St. Ann's Church.

Thornhill, Ont.

Messrs. Matson & Co., Aurora, Ont., have secured the electrical contract on a $33,000 school being erected in Thornhill, for Markham & Vaughan Townships.

Toronto, Ont.

Mr. W. S. Clegg, 79 Blackthorne Ave., has been awarded the electrical contract on a $75,000 residence being erected on Weatherall St., Toronto, for J. Thompson.

Mr. J. W. Griffiths, 358 St. Johns Road, Toronto, has been awarded the electrical contract on two $7,500 residences being erected on Armadale Ave., Toronto, for Chas. H. Bentley.

Messrs. Moss & Stocks, 1145 Yonge St., Toronto, have been awarded the electrical contract on a $17,000 residence being erected on Teddington Park Ave., for Dr. E. I. Zinken, 26 College St., Toronto.

Messrs. Clegg Bros., 79 Blackthorne Ave., Toronto, have been awarded the contract for electrical work on ten residences to be erected at Willard & Ardagh Sts., Toronto, by Mr. A. W. Reid, 87 Pleasant Road.

Messrs. Richardson & Cross, 81 King St. E., Toronto, have been awarded the contract for electrical wiring on a church to be erected at Vaughan Road & Helena Ave., Toronto, at an estimated cost of $50,000.

Messrs. Gibson & Pearson, 61 Hatherley Road, Toronto, have secured the contract for electrical work on six residences being erected at Durie & Ardagh Sts., Toronto, by Mr. Stan. Walker, 536 Queen St., West.

Mr. George Armstrong, 1319 Ossington Ave., Toronto, has been awarded the contract for electrical work on stores and apartments to be erected on Armadale Ave. & Bloor St., Toronto, at a cost of approximately $30,000.

The Canada Gazette announces the incorporation of the Radio Pictures Corporation, Limited, with a capitalization of $250,000, to manufacture and deal in radio apparatus and to handle radio pictures, etc. Head office, Toronto.

Mr. William Dean, 146 Jarvis St., Toronto, has been awarded the contract for electrical work on a church and rectory to be erected on Roncesvalles Ave., Toronto, by the parish of St. Vincent de Paul, at an estimated cost of $125,000.

The Ontario Gazette announces the incorporation of the Donald F. Johnston Radio, Limited, with a capitalization of $40,000. The firm is authorized to manufacture and deal in radio and other electrical apparatus of all kinds. Head office, Toronto.

An issue of debentures to provide $2,500,000 of additional capital to the local Hydro-electric Commission was recently passed by the Board of Control, Toronto. These funds are required for extensions to the distribution system, and other improvements. $500,000 is to be set aside for an addition to the Public Utilities Building; $300,000 for copper for existing positive railway feeders, and provision is made for 14,000 new meters and 1,000 new street lights.

Vancouver, B. C.

Work has been started on the electrification of about three miles of railway tracks serving industries on Granville Island.

Windsor, Ont.

The electrical contract on a residence on Bruce Ave., Windsor, has been awarded to A. M. MacPherson, 128 Victoria Road.

Winnipeg, Man.

The Star Electrical Co., 185 Lombard St., Winnipeg, have been awarded the electrical contract on alterations costing $11,000 being made to a building on Main & Alexander Sts., Winnipeg, owned by the Hemphill Trade Schools, Limited.

The Manitoba Gazette announces the incorporation of John N. Lyon Limited, with a capitalization of $500,000. The new firm is authorized to manufacture and deal in electrical apparatus of all kinds. Head office, Winnipeg.

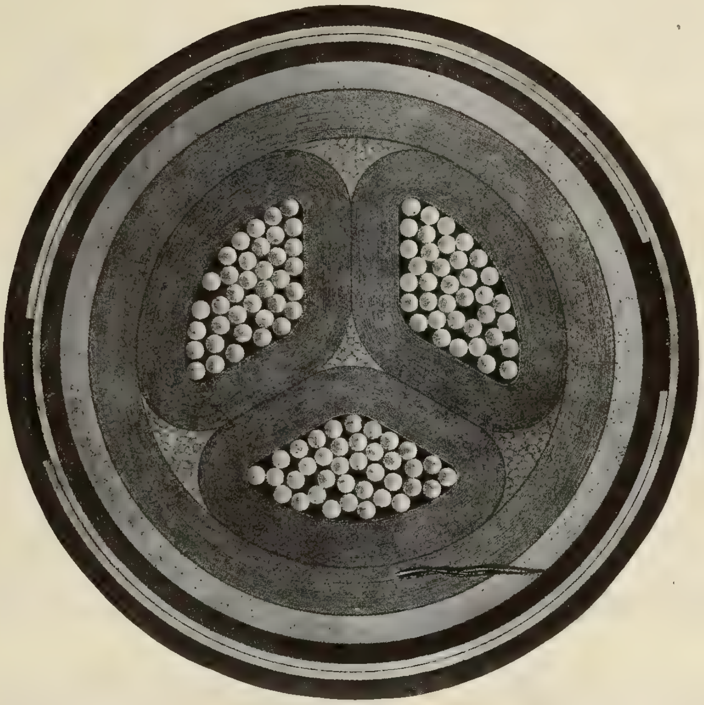
Electric Lighting Products Limited

Of interest to the lighting fixture trade throughout Canada, and especially to Toronto and Ontario dealers, is the recent formation of a new company, Electric Lighting Products, Limited, with office and showrooms at 149 Victoria St., Toronto, in the heart of the wholesale electrical district. This company, which is now open for business, will distribute an extensive line of high grade electric fixtures, marketing them solely through the fixture trade. Mr. G. W. Barber, for many years with McDonald & Willson, is managing director; Mr. H. M. VanGorder is sales representative serving the trade of Toronto, while Mr. I. Lewis will call upon out-of-town dealers. In addition to popular stock lines, this company is equipped to handle through dealers all fixture work of a special nature, such as for churches, schools, public buildings, etc. A complete line of fixture sundries, glassware and lamps will also be carried. All members of the trade are cordially invited to visit the display rooms and will join in wishing the new company a large measure of success.

Order for Steel Furnace

The Volta Manufacturing Company, of Welland, Ont., Canada, have recently booked an order from Renton & Fisher, Limited, of the Hopetown Steel Works, Bathgate Scotland, for one of their standard 3-ton capacity Heroult type electric steel furnaces, with transformer and switchboard equipment complete. The Volta Manufacturing Company, also build the "Duplex-Voltage" or "Quick-Melting" type of furnaces for melting steel and grey iron, as well as three-phase furnaces, of an improved design, for melting brass, aluminum, etc. Some of their more recent developments include electric annealing furnaces, electric core baking ovens, electric soldering iron heaters, electric babbitt heaters, electric water heaters, etc.

POWER CABLE



350,000 C. M. 3-Conductor 12000 volt
Paper Insulated, Steel Tape Armoured Cable

Overall Diameter—3.62 ins.
Built to Specification of Hydro-Electric Power Commission of Ontario

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Eugene F. Phillips Electrical Works, Limited
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The Oldest and Largest Manufacturers of Bare and Insulated Wires and Cables in the British Overseas Dominions

THE TOWN OF HARDISTY, ALBERTA

is open to consider a Franchise Agreement with the owner of an Electric Lighting Plant for an electric light service for the town. For particulars, apply to the Secretary-Treasurer, Hardisty, Alberta. 13-14

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Require a Coating

TRY Broughton's Stripping Collodion. We have been selling it in Toronto for many years.

The Geo. H. Broughton Co., Mfrs.,
126 Wellington St., West, Toronto.

13

FOR SALE

1 CROCKER WHEELER—150 H.P. 750 R.P.M. 550 volts 25 cycle 3 phase slip-ring 3 bearing Induction Motor with slide rails pulley and secondary controller for two minute starting duty only. With controller is furnished one primary interlocked oil switch with No-voltage and overload relays.

Apply to H. T. Jamieson, C.A. Trustee, 807 Royal Bank Building, Toronto. 13-14

Norse Dynamo Verksted

Kristiania - Norway

Export a. c. and d. c. Motors

Prices on request. H. O. 9483

13

Columbus Water-Works Dam

The re-advertisement of the contract for the O'Shaughnessy dam for the water-works of Columbus, Ohio, which brought seven bids on May 25, resulted in the award of the contract to the Thompson-Starrett Co., New York City, for $1,165,511, the lowest bid. All but one of the new bids was below the engineer's estimate of $1,376,700.

Home Building in the Dominion

A total of 19,947 residences, eight thousand fifty-nine of which are occupied by their owners, is credited to Ottawa in a summary of home building for ten of the principal cities of Canada. The relationship of home or house ownership is given as being forty per cent., while London, Ont., tops the list with 80 per cent., and Montreal, the largest city of the Dominion, is last with only five per cent.

The report states that there is no other country which shows so high a proportion of home ownership in the larger cities than does Canada, according to the figures compiled by MacLean Building Reports, Ltd. London has 14,000 residences, 11 200 of which are occupied by owners. Hamilton has 24,000 residences and 14,400 owners, occupying them. Calgary is represented with 13,500 homes in which 8,100 owners dwell. Toronto is rated as having 86,593 homes, of which 7,579 are occupied by their owners.

Halifax with a percentage of fifty-one, is shown to have 8,225 homes occupied by 4 226 owners. Vancouver has 22,129 residences of which owners occupy 10,271; Edmonton has 12,000, of which 5,400 are tenated by their owners; Winnipeg has 29,325, with 12,903 of their owners occupying them. Ottawa has 19,947 and 8,059 owners living in them, and Montreal 134,645 with 6 744 owners occupying them.

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In Stock for Immediate Delivery

100 h.p., 3 ph., 25 cyl., 550 volts, 710 r.p.m.
60 h.p., 3 ph., 25 cyl., 550 volts, 750 r.p.m.
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50 h.p., 3 ph., 60 cyl., 550 volts, 970 r.p.m
50 h.p., 3 ph., 25 cyl., 550 volts, 720 r.p.m.
35 h.p., 2 ph., 60 cyl., 200 volts, 1150 r.p.m.
30 h.p., 3 ph., 25 cyl., 550 volts, 750 r.p.m.
30 h.p., 3 ph., 25 cyl., 550 volts, 1500 r.p.m.
25 h.p., 3 ph., 25 cyl., 550 volts, 750 r.p.m.
15 h.p., 3 ph., 25 cyl., 220 volts, 720 r.p.m.
15 h.p., 3 ph., 25 cyl., 550 volts, 750 r.p.m.
15 h.p., 3 ph., 60 cyl., 220 volts, 1200 r.p.m.
13 h.p., 3 ph., 25 cyl., 550 volts, 700 r.p.m.
10 h.p., 3 ph., 66 cyl., 220 volts, 1333 r.p.m.
7½ h.p., 2 ph., 60 cyl., 200 volts, 1120 r.p.m.
5 h.p., 3 ph., 60 cyl., 550 volts, 1750 r.p.m.
5 h.p., 3 ph., 25 cyl., 550 volts, 1500 r.p.m.
3 h.p., 3 ph., 60 cyl., 550 volts, 1750 r.pm.
3 h.p., 3 ph., 60 cyl., 550 volts 1120 r.p.m.
3 h.p., 3 ph., 25 cyl., 550 volts, 1500 r.p.m.
3 h.p., 3 ph., 25 cyl., 550 volts, 1400 r.p.m.
2 h.p., 3 ph., 60 cyl., 550 volts, 1750 r.p.m.
2 h.p., 3 ph., 25 cyl., 550 volts, 1440 r.p.m.
2 h.p., 3 ph., 25 cyl., 550 volts, 1400 r.p.m.
1 h.p., 3 ph., 25 cyl., 550 volts, 1500 r.p.m.
1 h.p., 3 ph., 25 cyl., 110 volts, 1420 r.p.m.
1 h.p., 3 ph., 25 cyl., 220 volts, 710 r.p.m.
½ h.p., 1 ph., 60 cyl., 110 volts, 1725 r.p.m.
1/6 h.p., 1 ph., 60 cyl., 110 volts, 1725 r.p.m.
1/6 h.p., 1 ph., 60 cyl., 110 volts, 1150 r.p.m.

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3—3 HP. General Electric, 1500 rpm.
1— 5 HP. Robbins & Myers, 1500 rpm.
2—7½ HP. General Electric 1500 r.p.m.
1—10 HP. General Electric 750 r.p.m.

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1—10 HP. Can. Westinghouse 750 rpm.
1—20 HP. Lancashire Ball Bearing, 750 rpm.
1—25 H.P. Crocker Wheeler, 750 rpm.
2—50 HP. Crocker Wheeler 750 rpm.
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All Complete Base, Pulley and Starters

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1— 5 HP. Can. General Electric 1200 rpm.
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Complete Base Pulley and Starter

1-300 HP. A.C.B. 2200 volt, 3p, 60 cy, 430 rpm. 3 bearing complete

SINGLE PHASE MOTORS

2— 3 H.P. New Gen. Electric, Type RI, 110/220 v. 1500 rpm. Ind. Rep. Motor 25 cycle
1— 3 HP. Wagner 110/220 1750 rpm. complete.
1— 1 HP. Peerless 110/220 1750 rpm. complete.
1— ½ HP. Wagner 110/220 1750 rpm. complete.
1— ½ HP. Century 110/220 1450 25 cycle.
1— 4 HP. Century 110/220 v. 60 cy. 870 rpm.
2— 3 HP. 220 volt 3 ph, 25 cy., 750 rpm. Slip Ring.
2— 5 HP. 220 volt, 3 ph., 25 cy., 750 rpm. Slip Ring.
4—23 HP. 220 volt, 3 ph., 25 cy., 750 rpm. Slip Ring.

Last three items all Crocker Wheeler Brand New Motors, with reversible controllers & resistances complete. Suitable for crane or hoist duty. All in original crates.

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W. Mackenzie. *E. A. Dodington*

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15-30-50-75-100-300 Kw pulleys, bases and rheostats.

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3-5-7½-10-20-30 H.P. and upwards all complete.
All sizes of repulsion type single phase motors.
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1—20 H.P. 1200 RPM. Westinghouse, Complete
1—15 H.P. 1800 RPM. C.W., Complete
1—7½ H.P. 1800 RPM. T.H.E., Complete
1—7½ H.P. 1200 RPM. A.C., Complete
1— 5 H.P. 1200 RPM. Westinghouse
1— 2 H.P. 600 RPM C.G.E.
1— 1 H.P. 1800 RPM. T.H.E.
1— 2 H.P. 1800 RPM.

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1—7½ H.P. 1800 RPM. T.H.E., Complete
1— 3 H.P. 1800 RPM. T.H.E.
1— 1 H.P. 1800 RPM. T.H.E.
1—½ H.P. 1800 RPM. T.H.E.

SECOND-HAND 3 PHASE, 25 CYCLE, 550 V. MOTORS

1—50 H.P. 750 RPM. Westinghouse
1— 5 H.P. 1500 RPM. T.H.E.

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1—30 H.P. 750 RPM. Westinghouse
1—15 H.P. 750 RPM. T.H.E., Complete
1—10 H.P. 1500 RPM. T.H.E.
1— 1 H.P. 1500 RPM. Westinghouse
1— 1 H.P. 750 RPM. T.H.E.
1— 5 H.P. 1500 RPM. T.H.E.

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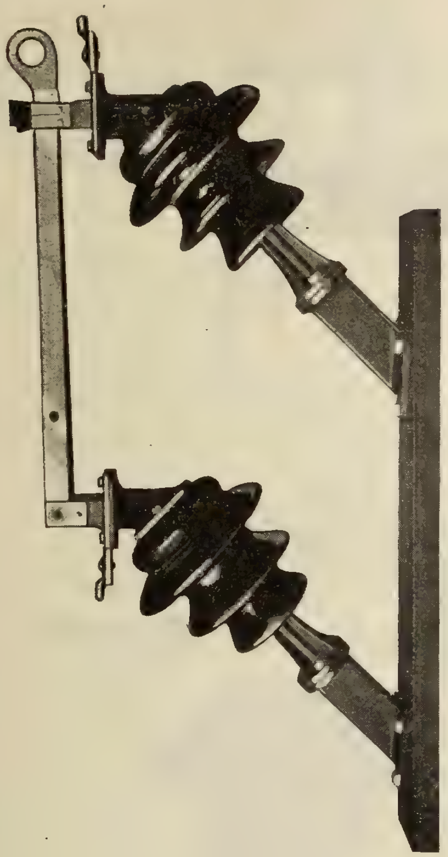

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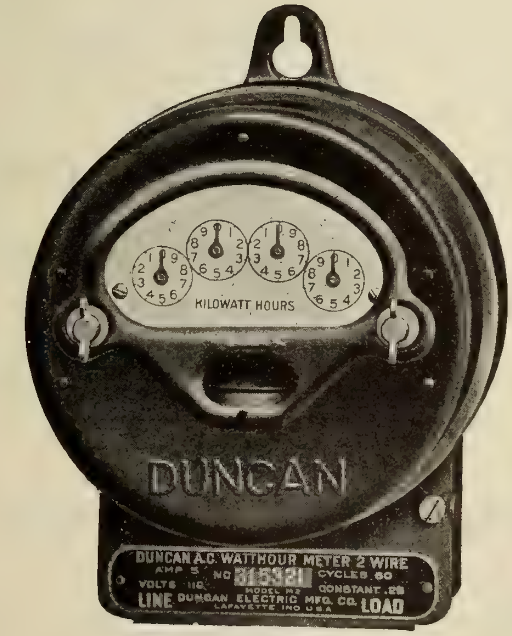

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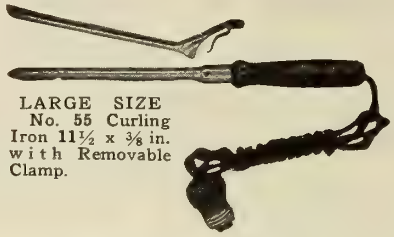

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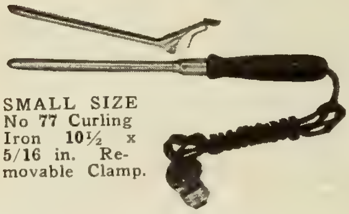

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Order from your jobber to-day. If he cannot supply you write us direct.

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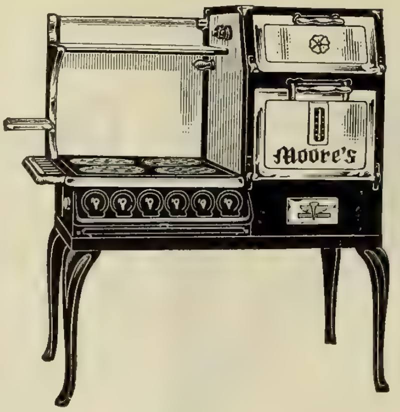

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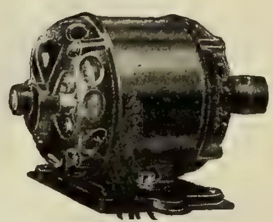

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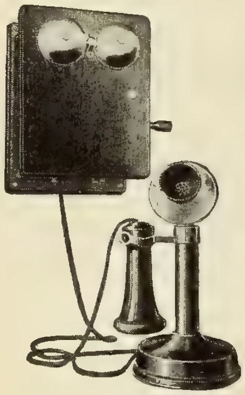

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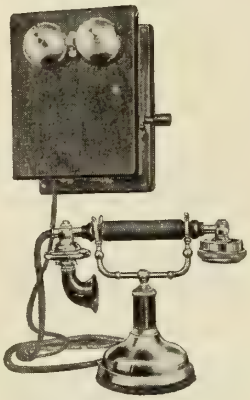

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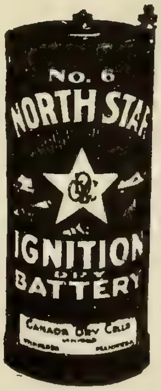

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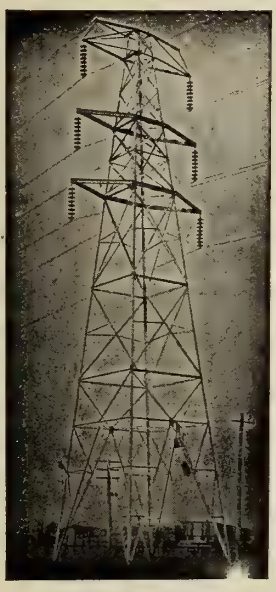

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Lamps of all kinds.

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Can't Get Stolen

They can't get knocked out or broken.

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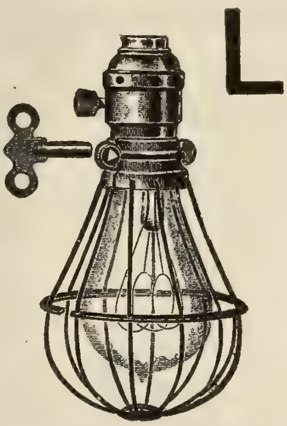

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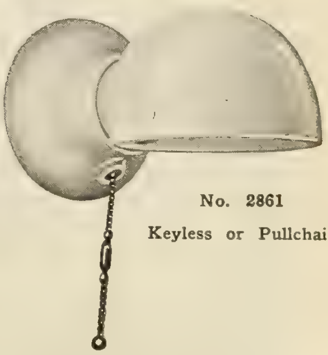

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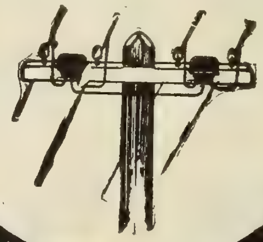
For TELEPHONE and TELEGRAPH LINES

The Chapman Lightning Arrester contains no pet theories to be exploded by the first storm. Just a delightful combination of common sense and experience put up in a substantial package which improves with age.

Installed at intervals along a line, they form natural spillways for lightning and static disturbances and are as permanent as the pole line.

In service from the Yukon to the Andes, from Tidewater to the Rockies.

Manufactured by
MINNESOTA ELECTRIC CO.
Minneapolis Minn.



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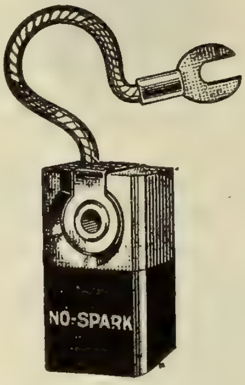

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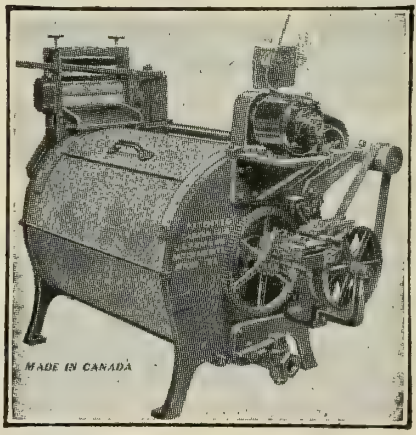

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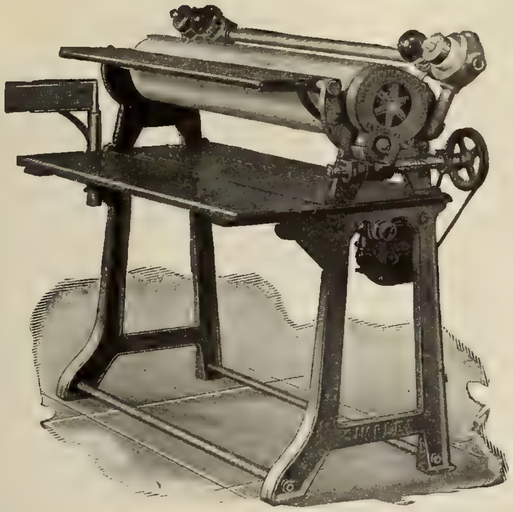

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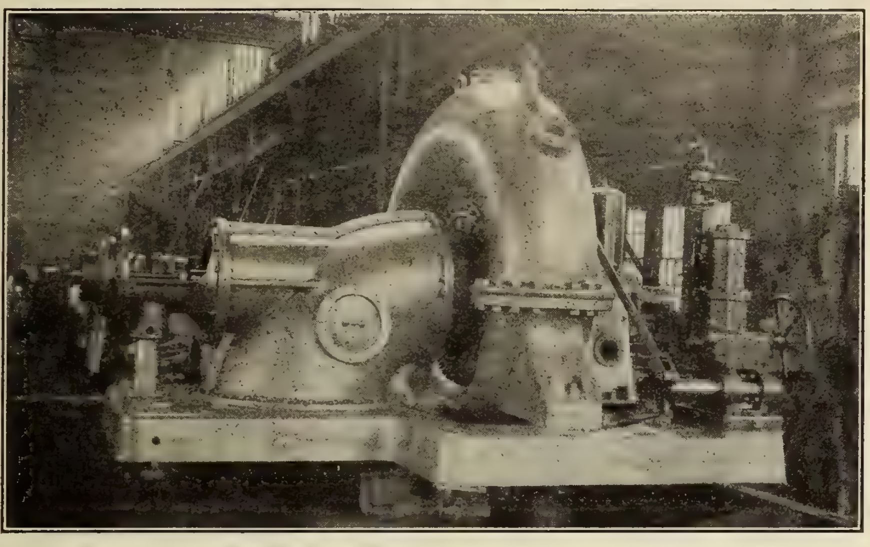

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"Testing of Electrical Machinery," for non-electrical students, by J. H. Morecroft. Fourth edition, revised and enlarged. Published by D. Van Nostrand Company, 1921. 220 pages, 111 illustrations. Price $3.00.

The Dynamo (2 volume), by Hawkins & Wallis. Published in 1909 by Whittaker & Company. Price $3.00.

The School of Practical Electricity (Electrician's Course in 2 volumes. Volume 1. Published by Electroforce Publishing Company, Milwaukee, Wis. 410 pages, illustrated. Price- $3.00

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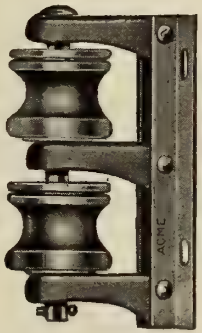

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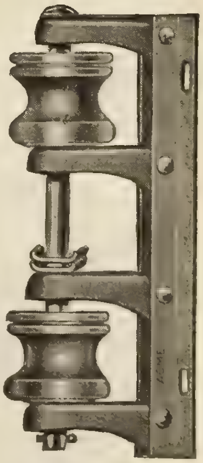

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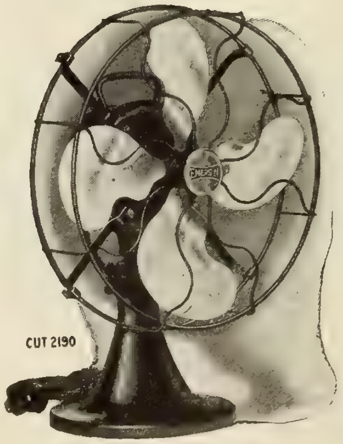

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Inspection during manufacture. Tests and Reports before shipping of: Electric Power Apparatus, Wires, Cables, Insulators, Transmission Towers and Hardware, Conduits, etc.
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Mechanical, Electrical, Hydraulic, Steam, Gas
Plans, Specifications, Estimates,
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Canadian Water-Powers Agency
(Registered)
CHARLES BRANDEIS, C.E., E.E.
Consulting Engineer
We negotiate sale and purchase of developed and undeveloped water-powers.
Estimates made on power available and costs of development.
390 Phillips Place, MONTREAL
Telephone Uptown 2825.

EARL W. MORPHY
Meter Engineer,
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Meters tested and Repaired
Interior wiring a specialty.
92 Gould St.
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KERRY & CHACE, Limited
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Hydro Electric & Steam Power Developments, Steam & Electric Railways, Pulp & Paper Mills, Industrial Engineering.
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CANADA ELECTRIC CO.
Contracting Electrical Engineers
"Work That Counts"
MAIN 1556
175 KING ST. E., TORONTO

PROMPT and EFFICIENT
ELECTRICAL REPAIRS
Give your electrical equipment the attention it deserves.
Our specialties are Re-wind and Motor Repairs A. C. & D. C. also Meter Repairing,
Electric Motor Repair Co.
349 Talbot St., London, Ont.

Electrical Testing
Laboratories

"Electrical, Photometrical and Physical Tests and Inspections".

80th Street and East End Avenue,
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Trade Marks and Designs
Procured in all Countries
Special attention given to
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Phamphlets sent free on apclication
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GEO. L. GUY
Electrical Engineer
Plans, Specifications and Estimates
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Save Money by Advertising for your Tenders

Competition will keep bids on your work or supplies down to the minimum figure. An advertisement in the

Tender Department
of the
Contract Record
and
Engineering Review

will put you in touch with the great majority of reliable contractors, and help you get the best firm for the job and the right price for the work.

Use the Contract Record Tender Department for the next job.

Westinghouse

Type S Distributing Transformer

Some exclusive insulation features that build reliability into Type S Transformers follow:

Westinghouse Type S Transformer

The coils are wound separately on moulds of mica-micarta barriers, and are inspected and tested before assembly with the magnetic circuit.

In the machine-wound high-voltage coils mica-micarta channel pieces provide a large creepage distance between the coil and iron, giving added protection against high-frequency surges.

Solid machine-moulded, mica-micarta barriers separate the high and low-voltage windings.

We manufacture a complete line of distribution transformers ranging in capacities from 1½ Kv-a. to 200 Kv-a. for pole, platform or manhole mounting. Our nearest sales office will give complete particulars regarding any style.

Canadian Westinghouse Co., Limited, Hamilton, Ont.

TORONTO, Bank of Hamilton Bldg.
HALIFAX, 105 Hollis St.
CALGARY, Canada Life Bldg.
MONTREAL, 285 Beave. Hall Hill
FT. WILLIAM, Cuthbertson Block
VANCOUVER, Bank of Nova Scotia Bldg.
OTTAWA, Ahearn & Soper, Ltd.
WINNIPEG, 158 Portage Ave. E.
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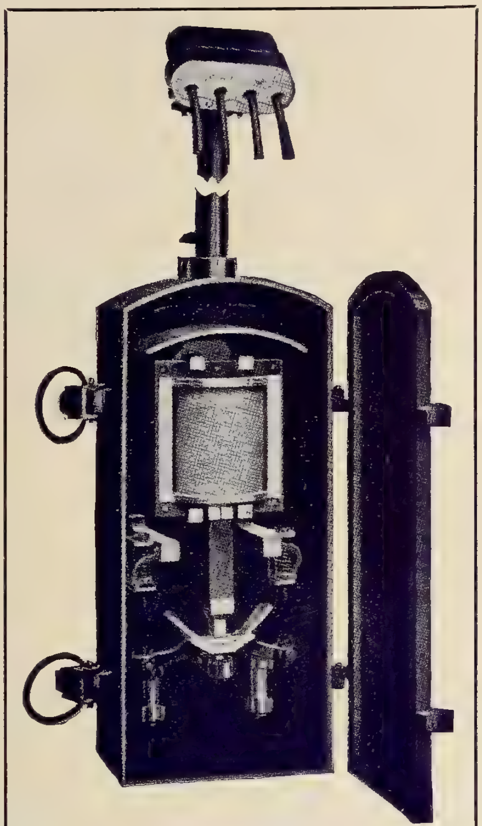
REPAIR SHOPS:

MONTREAL—113 Dagenais St.
TORONTO—366 Adelaide St. W.

VANCOUVER
1090 Mainland St.

WINNIPEG—158 Portage Ave. E.
CALGARY—316 3rd. Ave. E.



Cap. 30 Amp

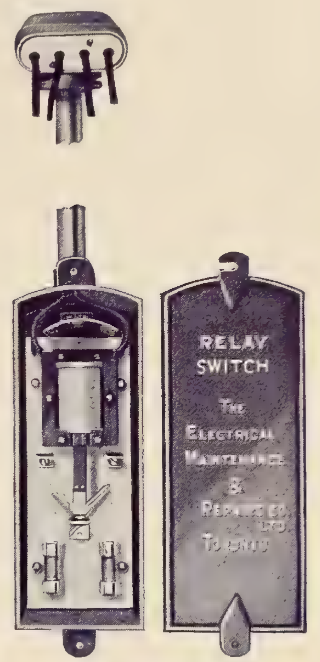
Engineers, Take Notice!

A new, smaller, simplified Remote Control Switch.

A young friend of our 30 Amp Switch—to do the many small jobs where the big fellow is too expensive.

Cheaper, yet perfectly dependable. Has been tested equal to five years' service.

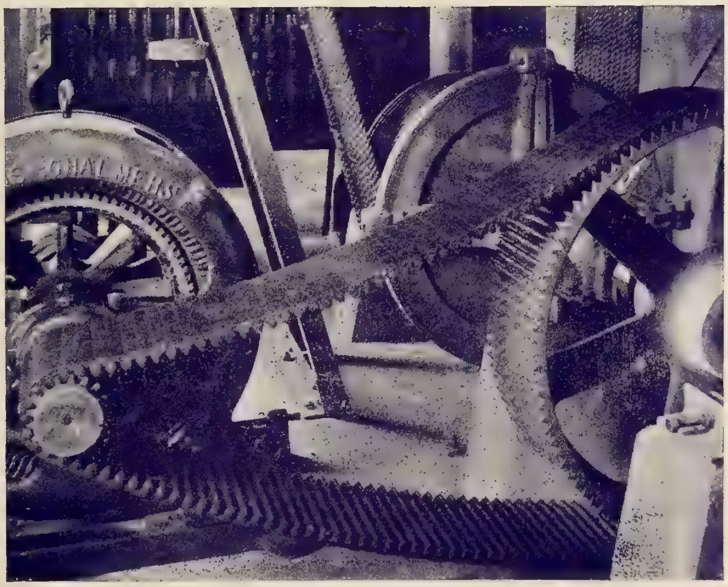
For Street Lighting Control. Write about this.



Cap. 15 Amp

The Electrical Maintenance & Repairs
Company, Limited
162 Adelaide Street West **Toronto**

Morse Silent Chains



100 H.P. Morse Chain Drives to Terminal Grain Elevator.
This is one of 39 Drives in the Elevator

YOU CANNOT BUY
a
BETTER DRIVE

If this picture suggests a possible application of Morse Chain Drives to troublesome or expensive belt transmissions in your factory consult our sales engineers.

The Cost of Application Is Not Large

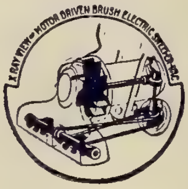
The Return on the Investment is a Large One

Canadian Agents

Jones & Glassco Reg'd
TORONTO **MONTREAL**

Electric
SWEEPER-VAC
With Motor Driven Brush

It Cleans and Sweeps without injury to the rugs
FULLY GUARANTEED
Sold on easy terms — We carry the accounts
Liberal Proposition for "Sweeper-Vac" Agencies


X-RAY VIEW OF MOTOR DRIVEN BRUSH ELECTRIC SWEEPER-VAC

Banishes Dirt

EARLE
LIMITED
ELECTRIC

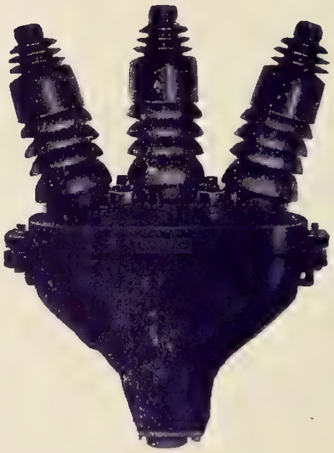
Abolishes Dusting

Takes the "Weeping" out of "Sweeping"
Write now for particulars and get lined up for the Spring Trade

66-72 NELSON ST.
TORONTO
Phone Adelaide 1081 — Adelaide 1082

CABLE TERMINAL DEVICES

G & W 35,000
VOLT POTHEADS



POTHEADS, DISTRIBUTION BOXES

for dependable service—

Continuous service from comprehensive distribution systems results from careful planning and from the selection of the right sort of equipment.

G & W Potheads are one strong link in any carefully planned system.

That they render a really dependable service, with little maintenance, has been proven on innumerable distribution systems.

You can judge them by the number of representative users who have adopted them as standard equipment.

The G & W Engineering Staff will co-operate with you in planning a completely serviceable distribution system. Tell us your problem.

G & W Electric Specialty Co.
7440-52 So. Chicago Ave. CHICAGO, U.S.A.
A. H. Winter-Joyner, Ltd., 62 Front St. W., Toronto.
A. H. Winter-Joyner, Ltd., 10 Cathcart Street Montreal.
Bentz-Richardson Co., Ltd., 592 Notre Dame Ave., Winnipeg.
General Supplies, Limited, Calgary and Edmonton.

G & W ELECTRIC SPECIALTY CO.

Vol. XXXI No. 14

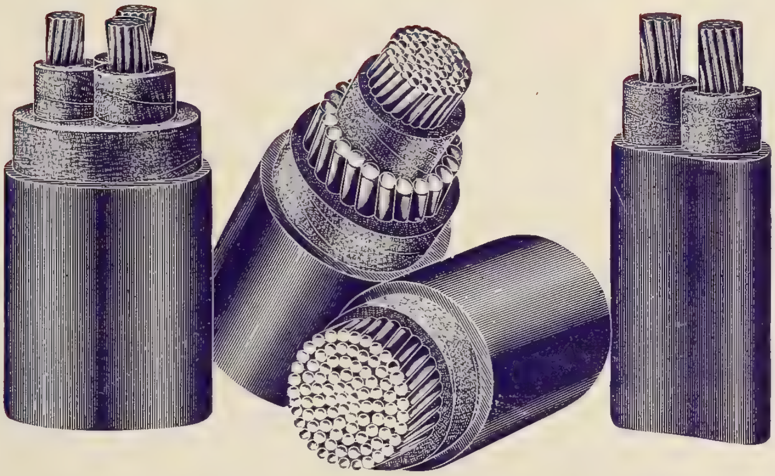
Toronto, July 15, 1922

Electrical News

Engineering
Contracting

Merchandising
Transportation

STANDARD
Wires and Cables



Bare Copper, Brass and Bronze Wires
Colonial Copper Clad Steel Wire
TRADE C.C.C. MARK
Weatherproof and Magnet Wires
Rubber Insulated Wires
Varnished Cambric Insulated Cables
Paper Insulated, Lead Covered Cables
Rubber Insulated, Lead Covered Cables
Steel-Wire and Steel-Tape-Armored Cables
Cable Terminals and Junction Boxes
"Ozite" Insulating Compounds, etc.

Catalogues and prices on request to our nearest office.

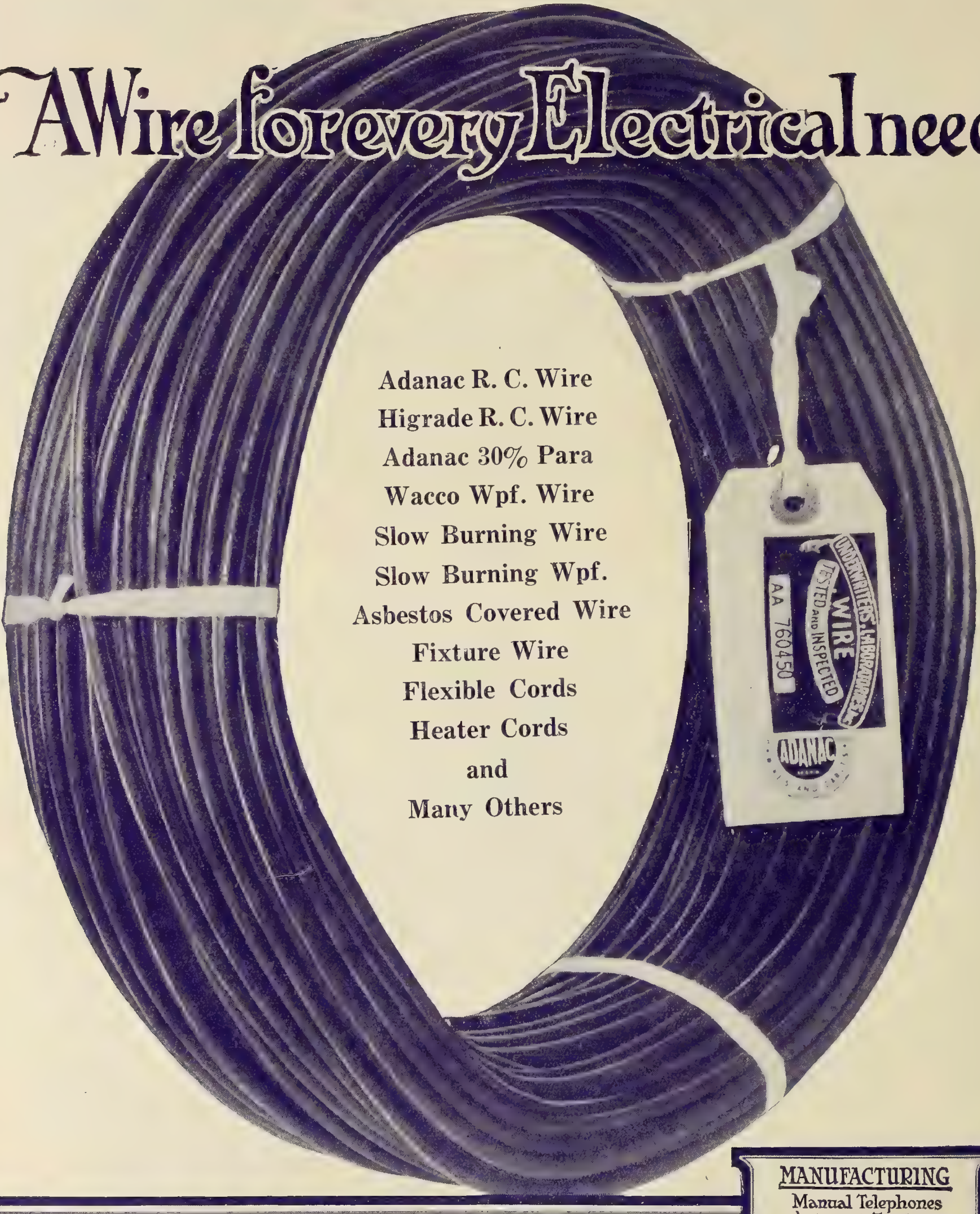
**Standard Underground Cable Co.
of Canada, Limited**

Sales Offices and Warehouses
Montreal, Toronto, Hamilton, Winnipeg, Seattle
Factory: Hamilton, Ont.

Alphabetical Index to Advertisers, Page 10

Classified Directory to Advertisements, Page 68

A Wire for every Electrical need



Adanac R. C. Wire
Higrade R. C. Wire
Adanac 30% Para
Wacco Wpf. Wire
Slow Burning Wire
Slow Burning Wpf.
Asbestos Covered Wire
Fixture Wire
Flexible Cords
Heater Cords
and
Many Others

Northern Electric Company
LIMITED

MONTREAL TORONTO WINDSOR CALGARY
HALIFAX HAMILTON WINNIPEG EDMONTON
QUEBEC LONDON REGINA VANCOUVER

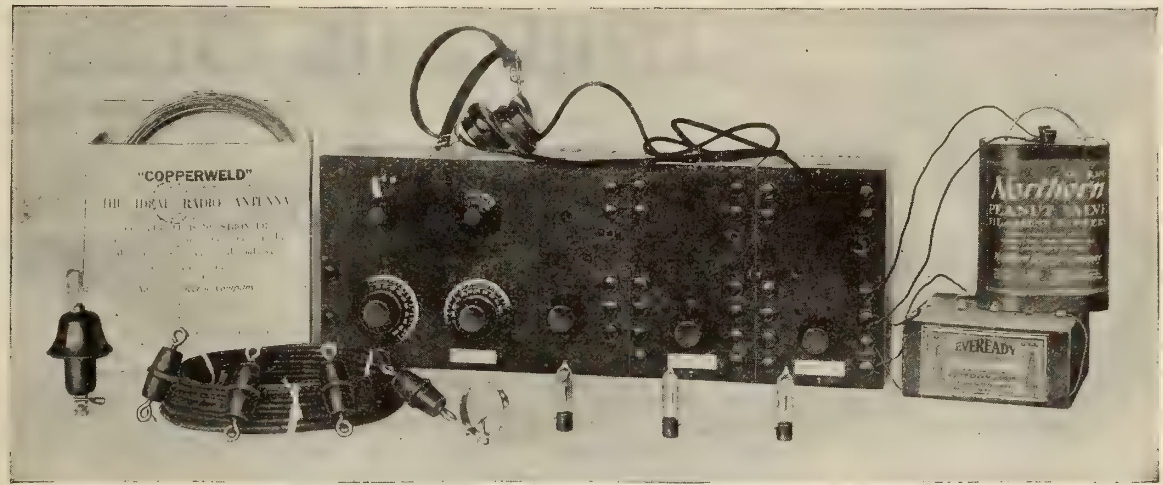
"Makers of the Nation's Telephones"

MANUFACTURING
Manual Telephones
Automatic Telephones
Wires & Cables
Fire Alarm Systems
Radio Sending and receiving Equipment

DISTRIBUTING
Construction Material
Illuminating Material
Power Apparatus
Household Appliances
Electrical Supplies
Power & Light Plants
Marine Fittings

ORDER THIS NEW SET EARLY

R 1000 Radio Telephone Receiving Set

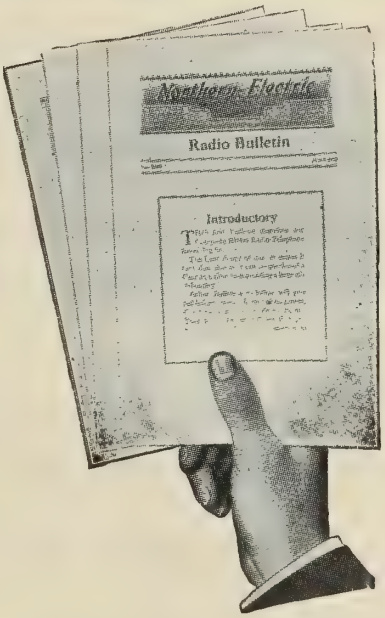


All Amateurs are your prospects with this set. You can sell it complete or a unit at a time in cases where the purchaser does not care to make a large initial outlay.

The wave length is from 200 to 600 meters, enabling the user to receive either local or distant Canadian or American Broadcasting, Shipping, Stock and Weather Reports, Official Time, etc.

Full instructions for installation and operation are packed with each set, thus simplifying your selling effort.

Detailed description and retail prices are in Bulletin No. 1000. Phone or wire our nearest House for your quota.



Northern Electric

Radio Bulletin

Introductory

The R1000 Radio Telephone Receiving Set Consists of:—

- 1 No. R1 Short Wave Tuner and Detector Unit.
- 2 No. R5 Amplifier Units.
- 1 No. R6 Double Head Set, 2500 ohms.
- 1 No. R650 Aerial System.
- 3 No. R215—A "Peanut" Valves.
- 1 No. R180 Northern Peanut Valve Filament Battery.
- 1 No. R90 45 Volt Plate Battery.

Northern Electric Company
LIMITED

MONTREAL TORONTO WINDSOR CALGARY
HALIFAX HAMILTON WINNIPEG EDMONTON
QUEBEC LONDON REGINA VANCOUVER

"Makers of the Nation's Telephones"

MANUFACTURING
Manual Telephones
Automatic Telephones
Wires & Cables
Fire Alarm Systems
Radio Sending and receiving Equipment

DISTRIBUTING
Construction Material
Illuminating Material
Power Apparatus
Household Appliances
Electrical Supplies
Power & Light Plants
Marine Fittings

Edwards Iron Box Bells and Buzzers

Now Made in Canada

These Bells and Buzzers are equipped with Fahnstock Clips which are a great improvement over the old style binding posts.

Gongs are riveted on and hammer rod is under gong where it cannot be bent or twisted.

All Bells and Buzzers carefully tested on Battery and Transformer before shipment.

Immediate shipment from Montreal stock.

Prices quoted on application.

Agents for Western Canada:
Cochrane-Stephenson & Co., Ltd. - Winnipeg, Man.

G. L. MacGillivray & Company Limited
3 St. Nicholas St., Montreal

W. H. MURDOCH
39 Duke St., Halifax

A. R. WOOLDRIDGE
220 King St. W., Toronto

Diamond·F

The Most Adaptable Insulating Material for the Electrical Trade

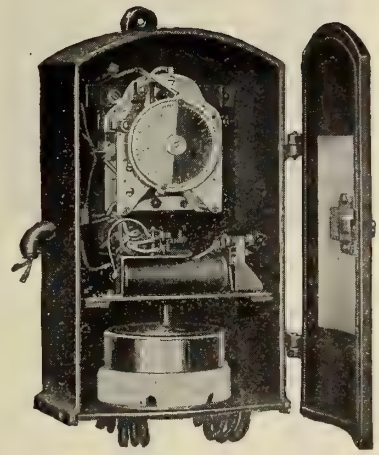
WHETHER your requirements call for a hard, close grain material for intricate machining, or the lighter, flexible product, Diamond Fibre is the insulation presenting the highest degree of economical efficiency to electrical manufacturers.

It is supplied in sheets, rods and tubes in all convenient sizes. Resiliency and strength combined in this material of exceptional dielectric powers make it the logical requisite for

Bushings,
Cleats
Commutator rings
Conduits
Fuse tubes
Insulation
Parts for dynamos and generators
Slot wedges
Switch bars
Switch handles
Lightning Arresters

Diamond State Fibre Company
of Canada Limited
Head Office and Works: 235 Carlaw Ave., Toronto, Can.

Self-Winding Time Switch



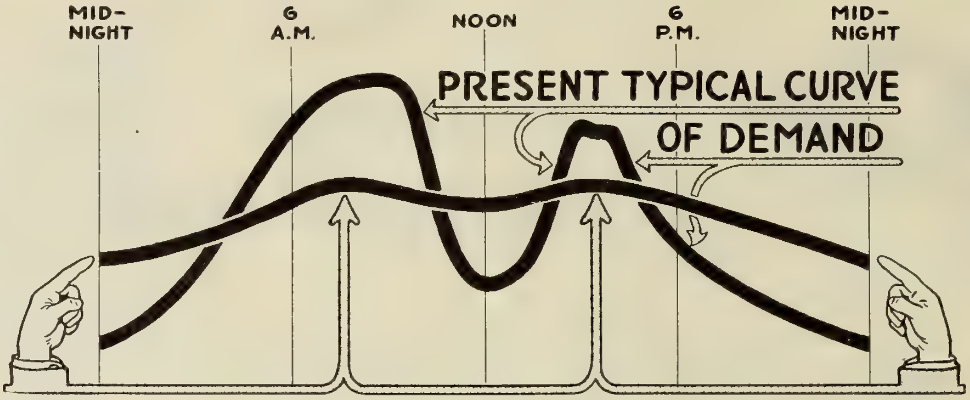
Every owner of a key-wound time switch will want a Self-Winding Time Switch when he realizes the superiority of this type. This is true because it does away with the big drawback of all key-wound switches—the need of someone to wind the clock. The value of such switches depends entirely on their being wound regularly by someone—it is very human to forget.

The time-keeping and the switch trip device units are encased in a dust, weather and vapor-proof heavy cast-iron case, neatly finished. The cover has a heavy rubber gasket, making the cabinet absolutely water tight. This switch can be operated on a transformer or on six dry cells.

The Devoe Electric Switch Company

414 Notre Dame St., West,
MONTREAL

105 Victoria Street,
TORONTO



MR. CENTRAL STATION MANAGER,—

Wouldn't You Prefer a Curve of Demand Like This?

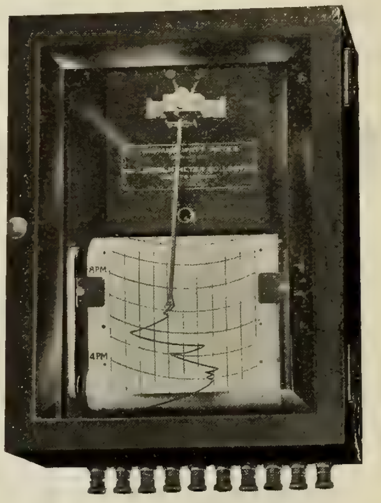
THE load curve of the average central station is one of high peaks and deep valleys. Fluctuations are caused by many customers taking their heaviest demands at the same time. The peaks indicate strains on the station's producing facilities—strains which can be eliminated only if power users will take their heavier demands at different times.

A Lincoln **Graphic** Demand Meter on a customer's feed line records the demands and when those maximums occur. A Lincoln Graphic connected to individual machines in a customer's plant indicates the amount and **time** of that particular machine's demand.

A Lincoln Graphic record might show it advisable to operate a heavy current consuming machine at an "off peak" period. For instance, an enameling process might be ran during early evening when the station demand is light. The strain on the central station's resources would be less—the station's load would tend to balance—the central station could take on more customers without adding materially to its equipment—the consumer could be given a better rate.

You know the advantages of knowing a customer's maximum demand. Let us go further into detail regarding the advantages of knowing **when** that maximum occurs. Write us today requesting Section IV of the Lincoln Catalog. No obligation.

The Lincoln Graphic graph of demand is smooth and easy to read at any point—even on highly fluctuating loads. No smear. No estimating. Ask us to explain.



The Lincoln Meter Co., Limited
243 College Street, Toronto, Canada
Cable "Meters" Toronto Phone College 1374

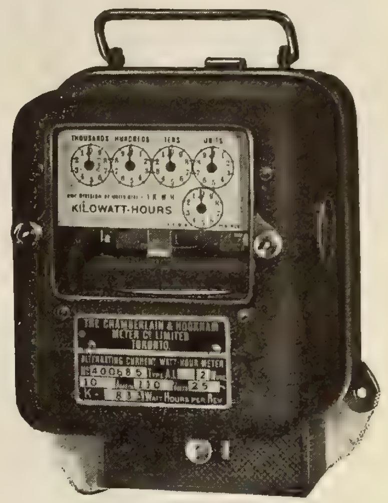
Lincoln
MAXIMUM DEMAND meter

Government Re-Testing

302 C & H Meters were due for re-inspection in an Ontario town.

They were sent into the test room on Monday, the following Friday 302 Meters left the test room re-sealed, no parts or repairs being required to accomplish this end.

How's this for quality and reliability? Send us your orders.


THOUSANDS HUNDREDS TENS UNITS
KILOWATT-HOURS
THE CHAMBERLAIN & HOOKHAM METER CO LIMITED TORONTO
ALTERNATING CURRENT WATT-HOUR METER
WATT HOURS PER REV

Chamberlain & Hookham Meter Co., Limited

243 COLLEGE STREET, TORONTO **Branches all over the World**

USED ELECTRIC MOTORS

IN STOCK JUNE, 5th

ALTERNATING CURRENT

550	Volts	3 Phase		60 Cycles
2	H.P.	1800	R.P.M.	A.C.B.
2	"	1200	"	G.E.
5	"	1800	"	A.C.B.
5	"	900	"	Ckr.-Wheeler
7½	"	1800	"	Thomson
7½	"	1800	"	Ckr.-Wheeler
7½	"	1200	"	Thomson
7½	"	1200	"	A.C.B.
7½	"	1200	"	Westinghouse
7½	"	1200	"	G.E.
7½	"	900	"	G.E.
7½	"	900	"	Westinghouse
10	"	1800	"	Lincoln
10	"	1200	"	Northwestern
10	"	1200	"	Burke
10	"	900	"	Ckr.-Wheeler
15	"	1200	"	A.C.
15	"	1200	"	G.E.
15	"	1200	"	A.C.B.
15	"	1200	"	Ckr.-Wheeler
20	H.P.	1200	R.P.M.	A.C.
20	"	900	"	C.G.E.
25	"	900	"	C.G.E.
25	"	900	"	Burke
30	"	1800	"	Burke
30	"	1200	"	Westinghouse
30	"	900	"	Westinghouse
30	"	900	"	Fairbanks
35	"	1800	"	G.E.
35	"	1200	"	Westinghouse
35	"	1200	"	G.E.
40	"	1200	"	Westinghouse
40	"	1200	"	C.G.E.
50	"	900	"	Ckr.-Wheeler
50	"	900	"	Lincoln
50	"	900	"	C.G.E.
75	"	900	"	A.C.B.
100	"	720	"	Westinghouse
200	"	625	"	Westinghouse
300	"	720	"	Westinghouse

220	Volts	3 Phase		60 Cycles
5	H.P.	1800	R.P.M.	Western
5	"	1800	"	G.E.
7½	"	1800	"	A.C.B.
10	"	900	"	Westinghouse
10	"	870	"	A.C.B.
25	"	1200	"	T. and H.
25	"	900	"	C.G.E.
30	"	650	"	Wagner
75	"	900	"	Westinghouse
75	"	720	"	Westinghouse

2200	Volts	3 Phase		60 Cycles
75	H.P.	720	R.P.M.	G.E.
200	"	514	"	Ckr.-Wheeler

1—250 K.W. 250 Volt 3 phase 60 cycle 600 r.p.m. C.G.E. revolving field type generator

All the above thoroughly overhauled, in first class condition and guaranteed.

NEW MOTORS

We build our standard type D Thomson Motor in all sizes up to 25 H. P.
We can make prompt deliveries. - - Write for our Price List.

FRED THOMSON CO., LIMITED

ELECTRICAL ENGINEERS

7-13 ST. GENEVIEVE STREET MONTREAL

TRICABLE

Used Extensively in Hamilton's Electrical Home Display

Hamilton, Ont.

Electrical Homes are being erected in various cities for the betterment of the Electrical Business in bringing out by display the many services which electricity can render.

While the appliances give the home the finishing touch, it is essential that it be properly wired for the safe carrying of current to the many outlets.

There is no better method of wiring than used in Hamilton's Electrical Home in which "TRICABLE" Armoured Conductor was used throughout.

"TRICABLE" is made in two and three conductors in sizes No. 14 to No. 2.

Stocked by all jobbers.

Selling Agents

Conduits Company Limited

33 Labatt Avenue TORONTO

A Three Hundred Thousand Dollar Trainload of A B C Electric Washers!

Sets a New World's Record. Another Example of A B C Popularity Everywhere

The unrivaled values offered by the latest model A B C Electric Washers have captured the country! Dealers are breaking all records. They report that the A B C is the best-selling line of washers on the market.

As a result, A B C's are not only being ordered by carloads, but by solid trainloads, too!

Consisting of 35 cars loaded with considerably more than 2,000 A B C's—three hundred thousand dollars' worth—the latest trainload left Peoria on July 1st. *This was the largest shipment of washers ever made in the entire history of the industry.*

It went to A. A. (Washer) Wilson of Los Angeles. For years he has retailed and distributed the A B C Line in Southern California. Mr. Wilson operates eight retail stores himself.

A short time previous, another trainload was shipped to the Morton Electric Co., retailers and distributors of A B C's at St. Louis.

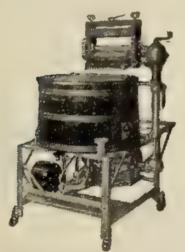
These trainload shipments clearly indicate what veterans in the business think of the A B C.

And the A B C is meriting such faith. Just recently, to cite one example, 706 A B C's were sold in thirty days at Philadelphia, by a single dealer.

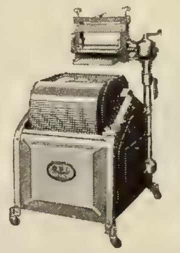
If you want to get into the washing machine business *right*, investigate the A B C Line.

It includes the three popular types, dolly, oscillating and reversing cylinder. The price range, $55.25 to $150, provides a washer for every prospect's purse. It is a line upon which to concentrate.

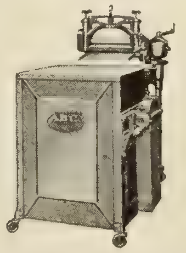
Get our proposition at once. You can bank on it as a winner! Liberal profits. Real co-operation. Wire or write today!



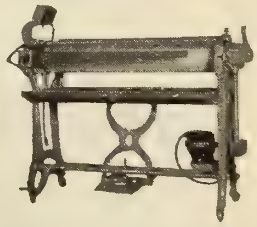
A B C "Alco" (dolly-type) Washers. Single and double tub. Power and electric.
$55.25 to $106.25



A B C Oscillator, full 6-sheet size, copper tub. Greatest value ever offered in electric oscillators.
$99



A B C Super Electric Washers, full cabinet models, are the finest washers on the market.
$135, $150



A B C Electric Ironers. Equipped with motors or to be operated by A B C washers.
$113, $145

All prices quoted are retail, east of Colorado

ALTORFER BROS. COMPANY, Peoria, Illinois
Pioneer and Leading Makers of Washers and Ironers

New York San Francisco Brantford, Canada

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Cutter Electric Co. 26

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FOR POWER, LIGHT AND TELEPHONE WORK

Incandescent Lamp Cord, Flexible Switchboard Cables, Special Cords and Cables for all kinds of Electrical Work.

Prompt Shipments from Canadian Factory.

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Electrical Contractors—The Star Electric Co., Kitchener, Ont.

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The most perfect interior construction conduit on the market. Recognized as the standard of high quality.

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A high-class interior construction conduit of the enameled type, proof against acid or other corrosive agents.

If your jobber cannot supply you—write us.

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TORONTO MONTREAL

Western Sales Office: 602 Avenue Building, Winnipeg

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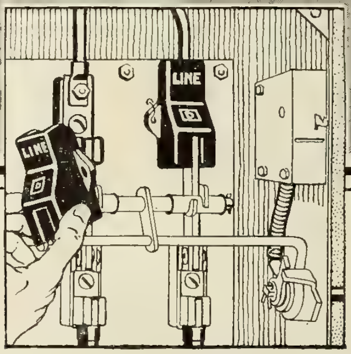
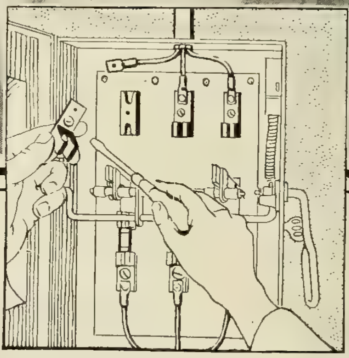
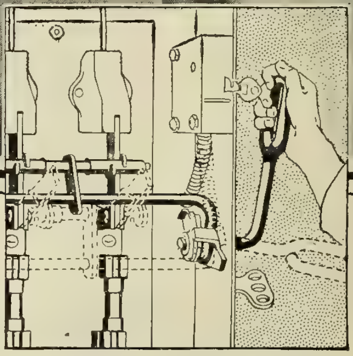


Protective covers for line terminals prevent shocks and shorts. Optional equipment



Individual bases permit removal of any blade or jaw in three minutes



Powerful quick make and quick break mechanism enclosed to prevent clogging by dust, etc.

SQUARE D

MAKES ELECTRICITY SAFE

Only if You Have a Key

Can You Open The Cover When The Switch Is On

The Square D patented cover control of the 80000 Series embodies, for the first time on any switch, every feature ever demanded of a safety switch.

When the switch is on, the cover cannot be opened; when the cover is open, the switch cannot be closed—*except by one who has the Square D key!* This key permits inspection of the switch without interrupting the circuit, and operation with the cover open. Or it will lock the cover permanently shut, whether the switch is on or off. This not only provides absolute safety, but prevents unnecessary stoppage of machinery when inspection is necessary.

Replace a Blade in 3 Minutes!

All current carrying parts can be quickly replaced from the front of the box because they are mounted on individual bases of moulded insulating material which will not break. Installation has been made easy; first, by allowing ample wiring space at top and bottom of the box; and second by Easy-Wiring end plates with knockouts or bushings to accommodate any kind of conduit or open wiring.

Electricians appreciate these two time and labor saving features.

New Type of Crossbar

The insulated steel crossbar of the 80000 Series provides strong and rigid construction. It cannot warp out of alignment—or char or split; Square D Multi-Spring Jaws have three tension points to maintain positive contact even with blistered blades; and the powerful quick make, quick break mechanism snaps the blades home sharply and completely. Located inside the box, it is protected against dirt and grease which might retard its operation.

The Ultimate Switch For Every Use

It is possible to obtain safety switches embodying some of the features of this new Square D. But no other switch has them all. No other switch is so adaptable for every conceivable use or gives such complete and lasting satisfaction from every standpoint. Write our nearest office. A representative will bring a switch and show you its superiorities.

SQUARE D COMPANY, Walkerville, Ontario, Canada (15)
Sales Offices at Toronto and Montreal

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FOR EVERYONE

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Our prices at all times are according to the prevailing market.

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Great West Electric Co. Ltd.

Winnipeg, Man. **Calgary, Alta.**

MOLONEY TRANSFORMERS

RELIABLE AND EFFICIENT

Reliability under the severest conditions has always been one of the most desirable features of MOLONEY Transformers. That they are also efficient and give long service is proved by their ever increasing use from coast to coast. Let us send you full particulars.

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We are manufacturers, in a large way, of

TOP PINS, SIDE BRACKETS, POLE STEPS AND CROSS ARMS

We have been supplying this pole line material for years, from coast to coast, to the largest telephone, telegraph and electric lighting systems.

Our goods are specified where efficiency and economy are measured by actual results and not by purchase price only.

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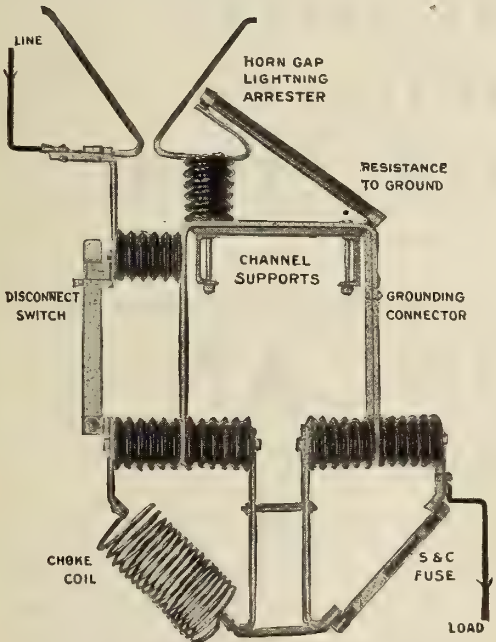
Lachute Mills, P. Q.



ONE SINGLE POLE "XW" UNIT
Horn Gap Arrester with Series Resistance to Ground, Disconnecting Switch, Choke Coil and "S & C FUSE" Mounting.

Simplified Substations with Complete Protection

for small and moderate loads for Rural Service, Small Towns, Industrial plants, etc.

The Economy and Simplicity of these Compact Assembled Units is at once apparent.

They are made in single pole, two pole and three pole combinations mounted on galvanized structural steel supports ready for your poles, with or without rod for operating switches from the ground.

7500-15000-25000-37000 Volt Service

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The potential and series electro magnets of the

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are of the simplest possible form and their replacement is cut one-third to one-sixth the cost of others. Again, the manner in which these elements are fastened to the cast grid renders their getting out of alignment impossible; therefore, the Duncan Model M2, once right, always right.

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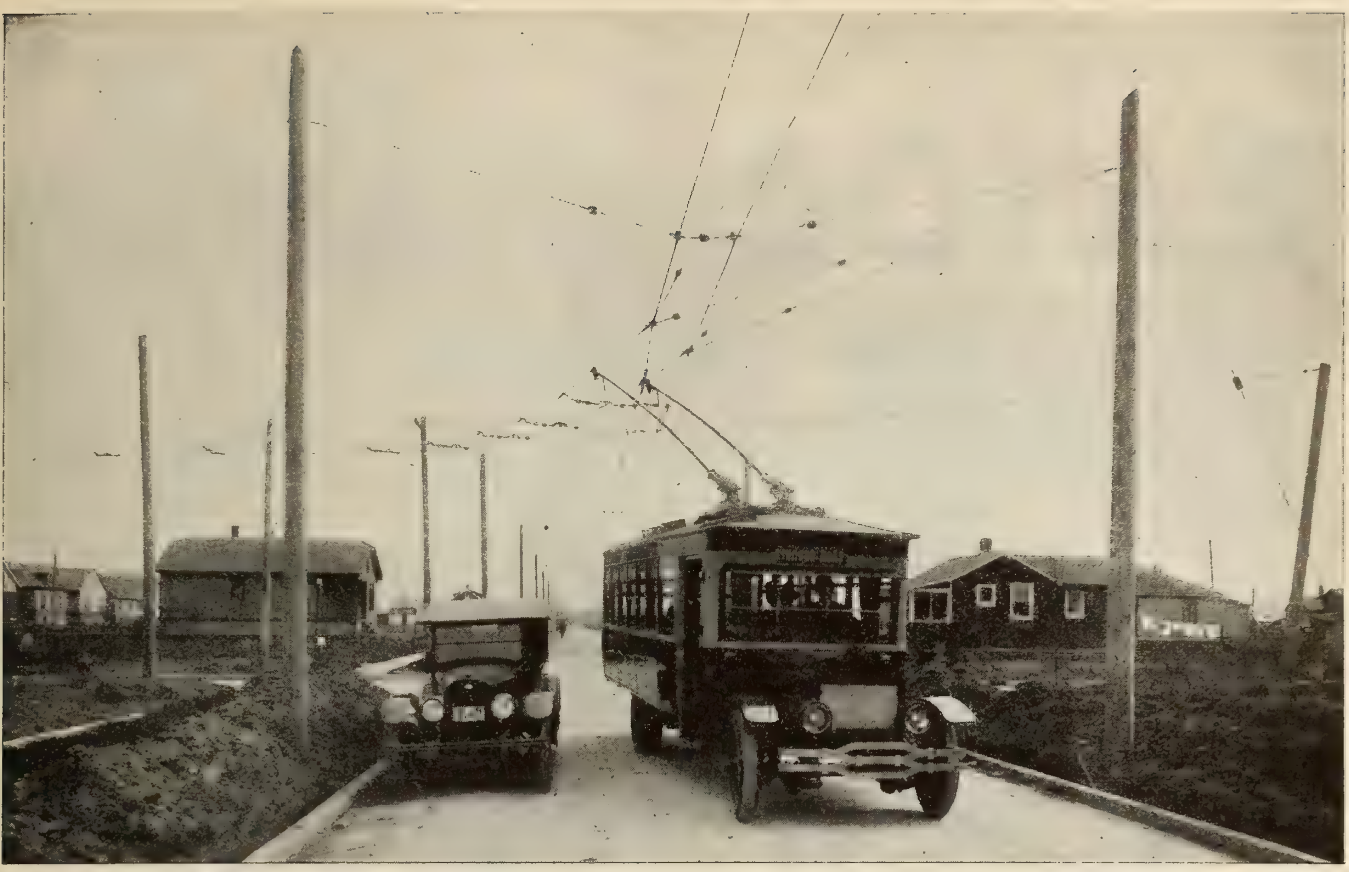
MONTREAL



The first of four buses in operation at Windsor, Ontario. The operator has just driven around the block and is starting over the line. He makes the round trip without leaving his seat. Buses built by St. Louis Car Company

Windsor's Trackless Trolley Successful from the Start

A trackless trolley system has been put into operation at Windsor, Ontario, by the Hydro-Electric Railways. The first bus went into service early in May and everything has gone smoothly from the start.

One of the prime factors in this immediate success was the trolley line. Look at the photograph—the Hydro-Electric Railways constructed as neat a piece of overhead as you will find anywhere—all built with standard O-B materials.

The buses—fine looking vehicles—are equipped with O-B Current Collection Equipment, including two bases, two poles and two insulated swivel harps which take standard trolley wheels. The buses are also equipped with O-B Retrievers, Crouse-Hinds Imperial Headlights and O-B Emergency Lighting System, which provides tail and dash lights automatically if the trolley current is interrupted.

The Ohio B Brass Co.

Main Office and Works: Mansfield, Ohio, U.S.A.

Products: Trolley Material, Rail Bonds, Electric Railway Car Equipment, High Tension Porcelain Insulators, Third Rail Insulators

Exide

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BATTERIES

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EXIDE BATTERIES OF CANADA LIMITED

At the Entrance to the Canadian National Exhibition

For Every Purpose

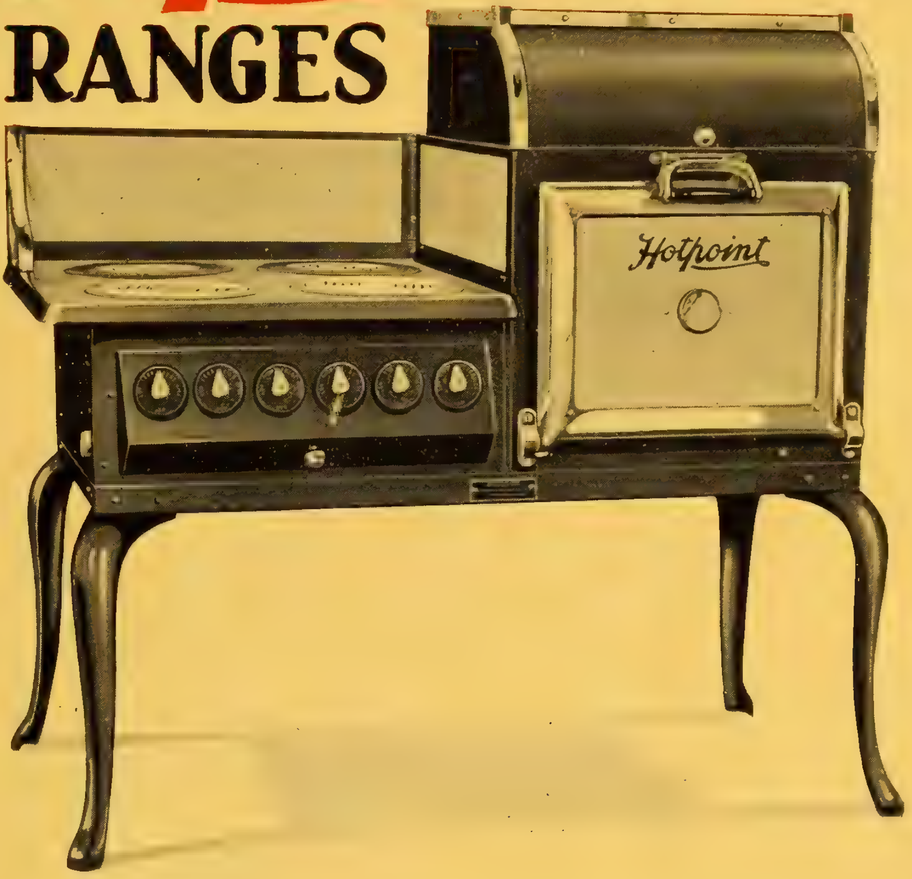
Scores of great industries rely on the willing power of Exide Batteries.

Exides propel mine locomotives and trucks; they light railway trains, operate switches, provide current for the telephone system and in many other ways play an active part in the daily life of the Dominion.

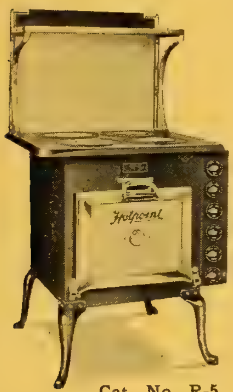
All types of Exide Batteries for all purposes are sold by Exide Batteries of Canada, Limited. You are invited to take up with us any battery problem that may arise in your business.

Exide Batteries of Canada, Limited
153 Dufferin Street, Toronto

The New Hotpoint RANGES



Cat. No. R-11



Cat. No. R-5

Cat. No. R-4

The R 8 has the SAME COOKING CAPACITY as the Standard Cabinet type Range with 40% LESS SURFACE to Clean ——

It is equipped with everything of the very latest and most up to date in range development.

The mechanical connections are of the most recent type with porcelain terminal blocks, and 3 wire single conductor cable to each unit. The surface elements are of the new spiral wound type—easily removable.

The oven has rounded corners, and an exceptionally smooth surface. Both units are hinged, and the oven racks are removable. The lining is of copper bearing steel, which will not corrode. All units are separately fused—fuses being readily accessible.

The warming closet is designed to allow practically the same clearance, when the door is opened, as the old No. 50 Range. No element is installed; owing to special construction of the oven, approximately the same temperature is obtainable as with a 600 watt unit, without loss of heat to the oven. The warming closet provides a shelf on top—no left hand models are required.

Each switch is mounted separately, and can readily be removed without disturbing the remainder.

"Made in Canada"

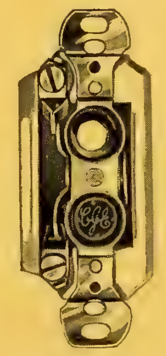
Canadian Edison Appliance Co., Limited

STRATFORD, ONTARIO.

C. G. E. Flush Push Switches

5 ampere three-way switch. Catalogue No. C.G.E. **3010.** Hydro approval No. **108.**

10 ampere double pole switch. Catalogue No. C.G.E. **2010.** Hydro approval No. **108.**



5 ampere single pole switch. Catalogue No. C.G.E. **1010.** Hydro approval No. **108.**

THE outstanding feature of this device is its simple rugged construction. There are no delicate parts to get out of order. Most of the mechanism is manufactured from flat, steel pieces, nickel plated to prevent tarnishing or rust.

The operating spring, held in place by the central shaft, works freely under compression, thus having a much longer life than a tension spring, which has to be secured in some manner, and this usually proves to be the weakest point of the spring, consequently the switch itself.

Another important feature of this switch is the extra long stroke of the push button, which permits greater adjustment of the switch in the box, than other types of switches.

"Made in Canada"

Canadian General Electric Co., Limited

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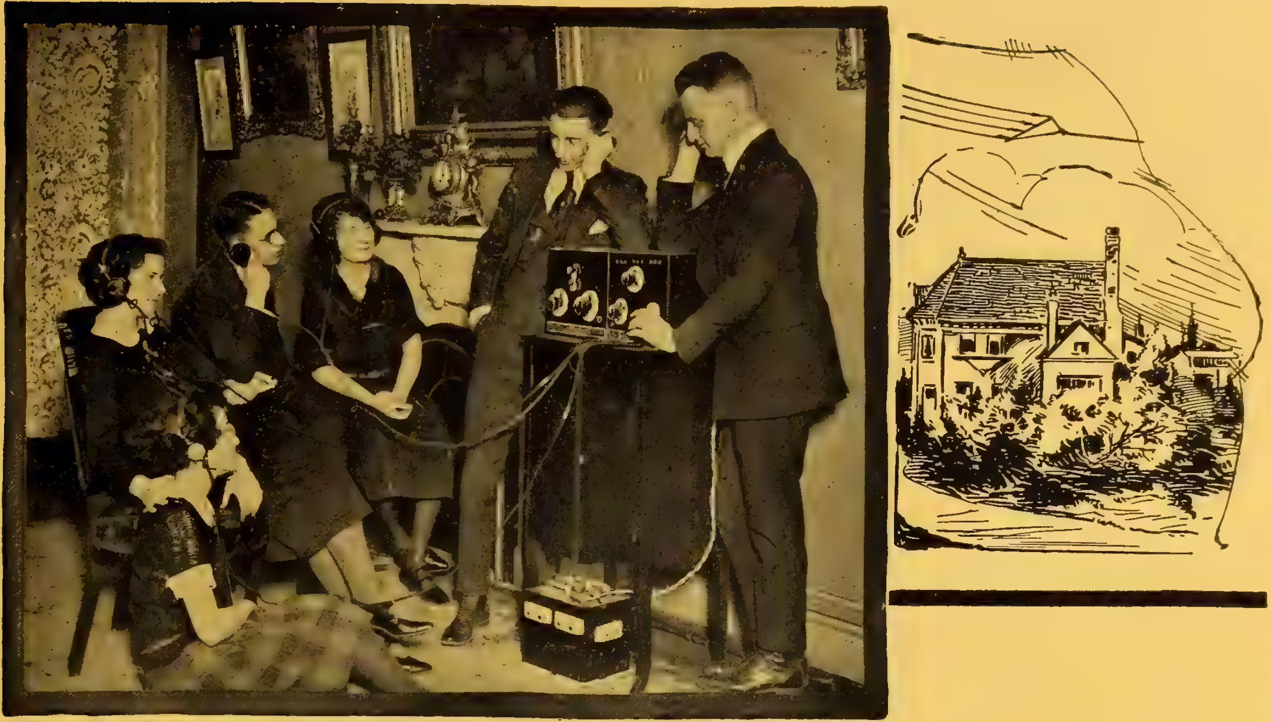
Branch Offices: Halifax, Sydney, St. John, Montreal, Quebec, Cobalt, Ottawa, Hamilton, London, Windsor, South Porcupine, Winnipeg, Calgary, Edmonton, Vancouver, Nelson and Victoria.



A New Market for An Old and Tried Product

Five Amp. Tungar Battery Charger

Charges one 6-volt lead cell battery at 5 amperes, one 12-volt battery at 3 amperes or one 18 volt battery at 1.5 amperes.

There is also a 2 amp. size which will charge a 6-volt battery at 2 amperes, or a 12 volt battery at 1 ampere.

Electrical dealers can broadcast some good news to the thousands of owners of wireless telephone and telegraph sets. The Tungar battery charger puts an end to the annoyance and expense of taking storage batteries to a service station for charging.

Connected to any alternating current lighting circuit the Tungar charges the battery quietly, quickly and at a small cost for current. An overnight charge once or twice a month will keep the battery in perfect condition, lengthening its life and increasing its efficiency. An added selling point for the Tungar is that it can also be used for charging automobile starting and lighting batteries and to furnish direct current for a variety of electrical experiments.

The Tungar will be promoted this year by extensive advertising in radio papers. It is dependable, easy to sell and offers a satisfactory profit.

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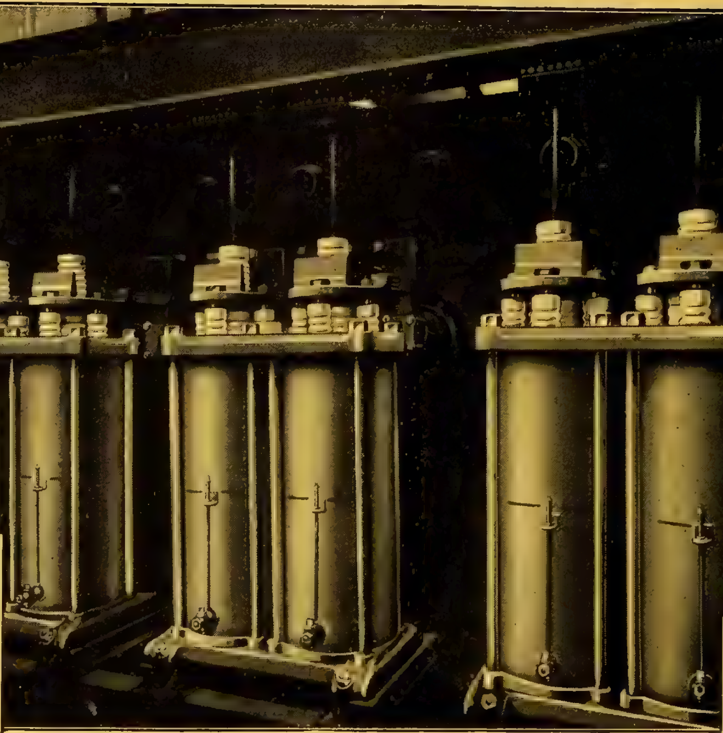
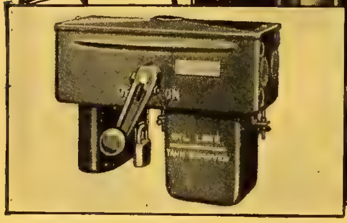
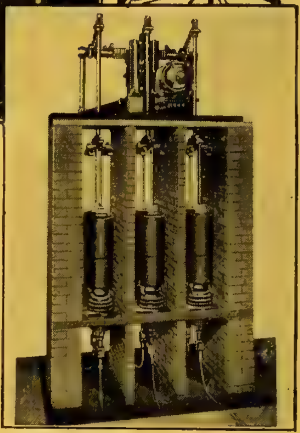


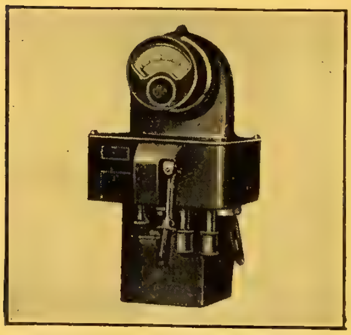
FHD-21 Oil Circuit Breaker for Queenston, Interrupting capacity 1,500,000 kv.a., operating mechanism on I-beams above



FP-10 OIL CIRCUIT BREAKER FOR SMALL CAPACITY INDUSTRIAL CIRCUITS.



FH-3 OIL CIRCUIT BREAKER FOR USE ON LARGE CAPACITY SYSTEMS.



FK-20 OIL CIRCUIT BREAKER (WITH AMMETER) FOR GENERAL INDUSTRIAL SERVICE.

C. G. E.
Oil Circuit Breakers

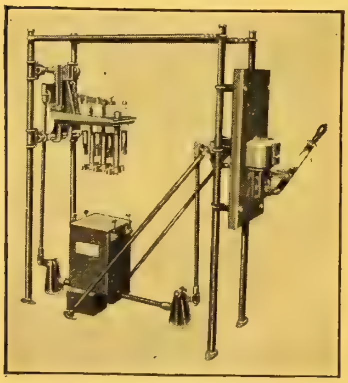
THE use of alternating current has resulted in an amazing extension of the application of electricity for all kinds of service. The necessity of safely controlling its transmission and use, has resulted in a corresponding advance in the design and manufacture of Oil Circuit Breakers, which are generally recognized as being the best means of control.

Mills and Factories find it both practicable and economical to use alternating current exclusively and many of the more modern ones are equipped throughout with Oil Circuit Breakers instead of air break switches and fuses. The Canadian General Electric Company carries a complete line of Industrial type Oil Circuit Breakers.

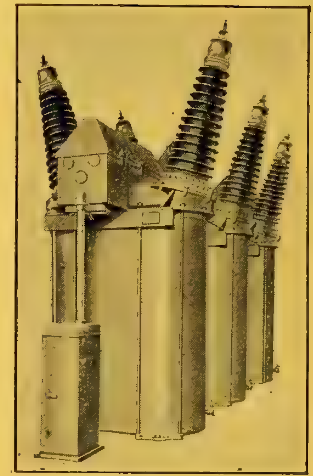
Power Plants and Sub-stations, of moderate capacity and voltage, have a complete range of C.G.E. Oil Circuit Breakers from which to select the type that best fits the actual local conditions.

C.G.E. Oil Circuit Breakers, for potentials up to 220,000 volts and for interrupting capacities up to 1,500,000 kv.a. or even higher, can be supplied for large systems and "Super-power" plants.

The correct application of Oil Circuit Breakers involves deciding on (a) normal voltage rating, (b) normal current rating, (e) short time current rating, (d) interrupting capacity, (e) arrangement, (f) method of operation and (g) automatic protective features. Our Engineers will be glad to assist you in arriving at the best solution of your Oil Circuit Breaker problems.



FK-5 OIL CIRCUIT BREAKER FOR USE ON SMALL AND MODERATE CAPACITY SYSTEMS



HIGH TENSION FKO-36 OIL CIRCUIT BREAKER.

Canadian General Electric Co., Limited

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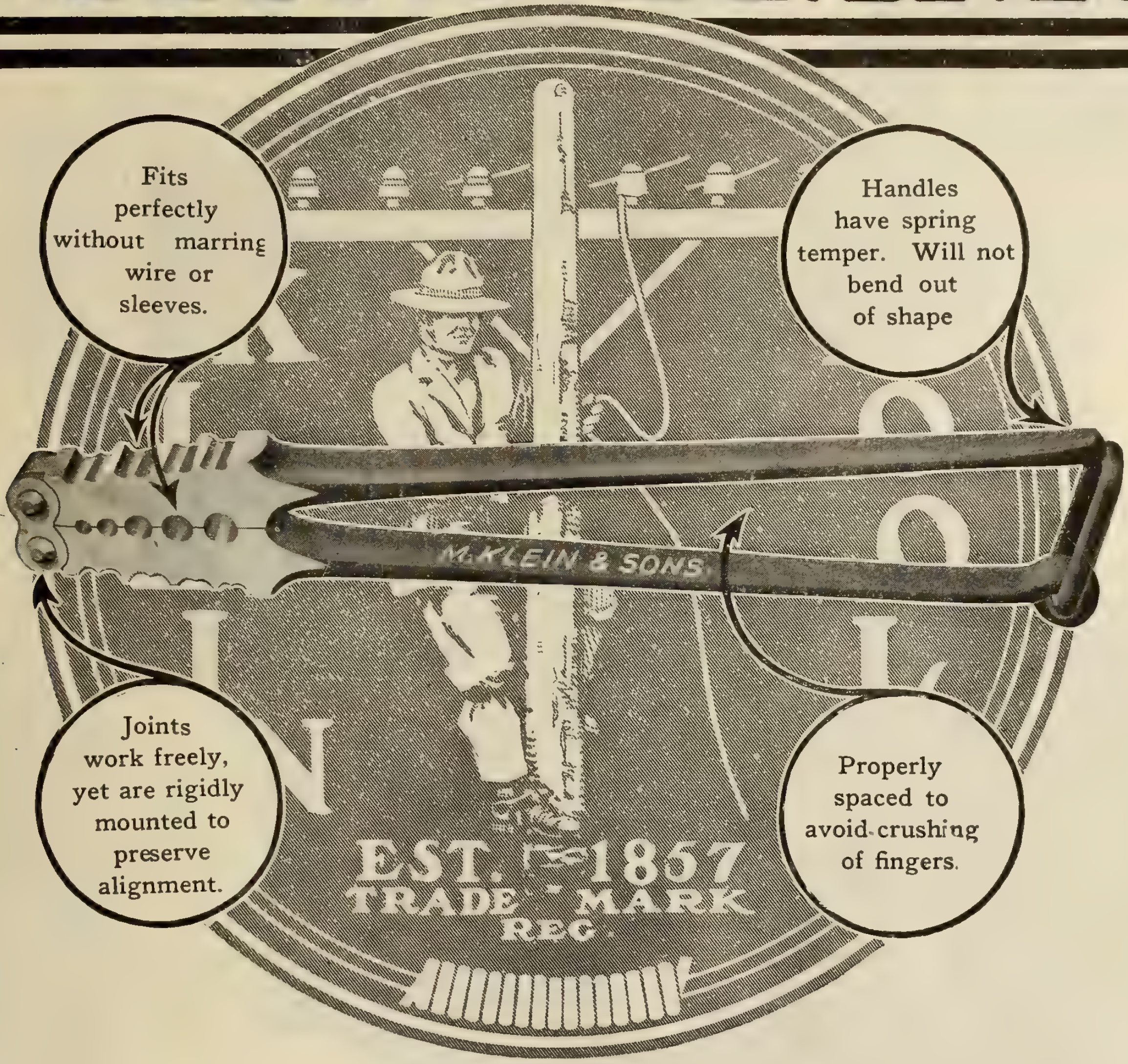
KLEINS CLAMPS



Fits perfectly without marring wire or sleeves.

Handles have spring temper. Will not bend out of shape

Joints work freely, yet are rigidly mounted to preserve alignment.

Properly spaced to avoid crushing of fingers.

The First Splicing Clamp was a Klein Splicing Clamp !

It is a fact that the Klein Splicing Clamp is the ancestor of all splicing clamps. 67 years of experience in making linemen's tools still keeps it the first.

The old-timers know that especially designed joints permit a Klein Splicing Clamp to work freely, without loss of alignment—that the handles are properly spaced to avoid crushing of fingers—and that the dies are snugly fit to gage and will not injure the wire or sleeves when twisted.

Equip your outside gangs with the best! Buy Klein Splicing Clamps!

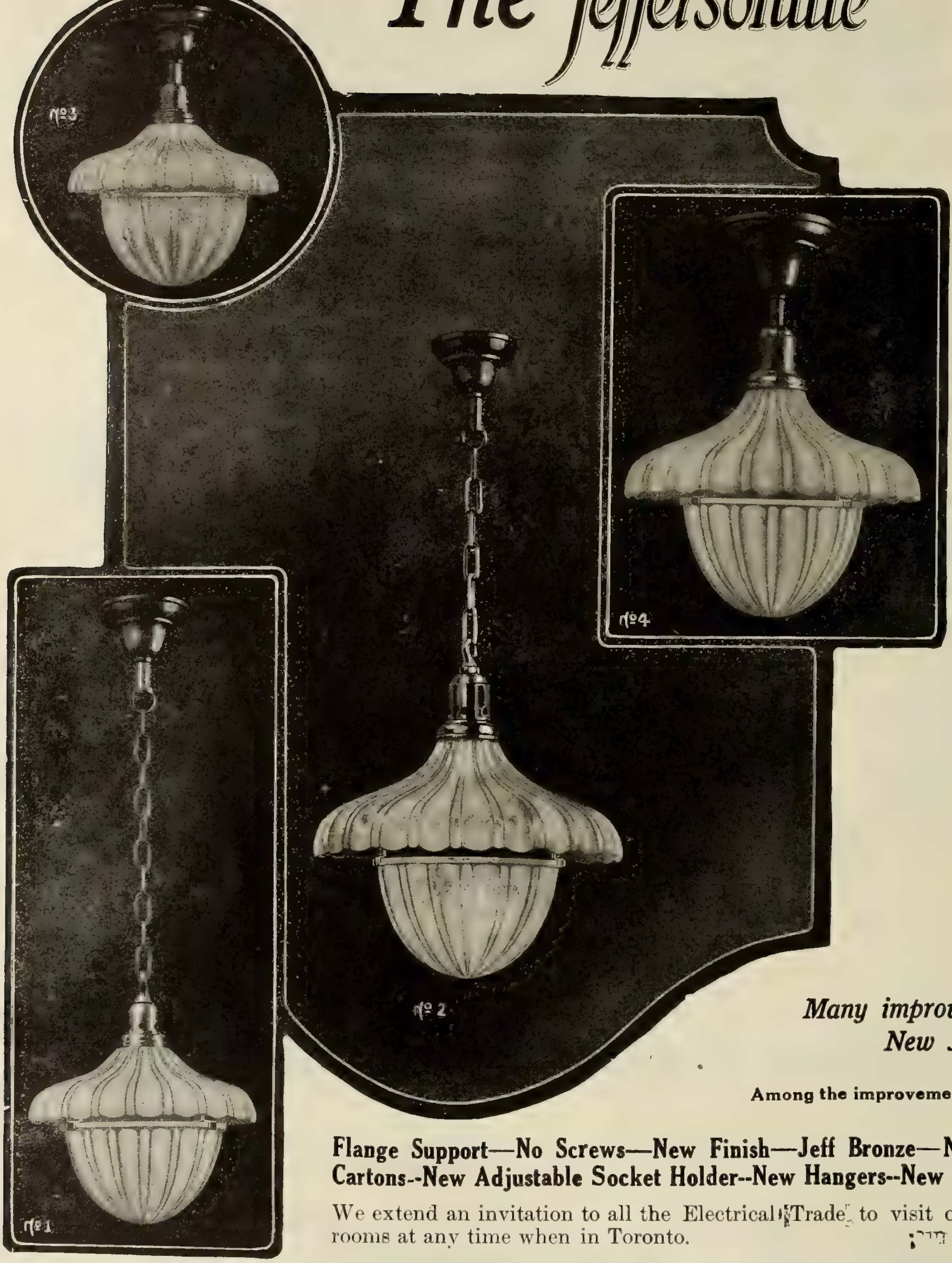
Mathias KLEIN & Sons

Established 1857

Chicago. Ill. U.S.A.

MADE-IN-CANADA

The "Jeffersonlite"



Many improvements feature the New Jeffersonlite

Among the improvements are—

Flange Support—No Screws—New Finish—Jeff Bronze—New Bowl—Individual Cartons--New Adjustable Socket Holder--New Hangers--New Package--New Prices.

We extend an invitation to all the Electrical Trade to visit our Bay Street Showrooms at any time when in Toronto.

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272 MAIN STREET
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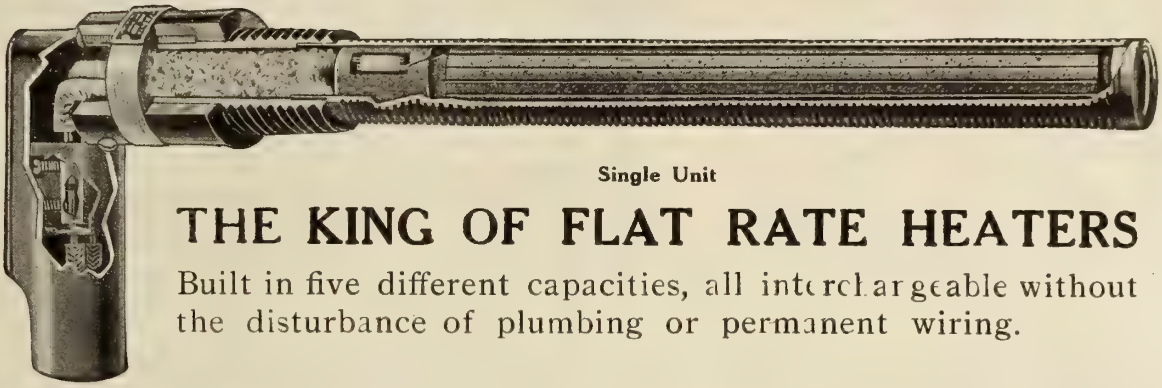
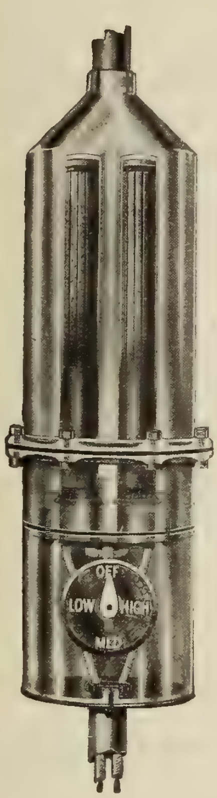
Water Heating Devices



Single Unit

THE KING OF FLAT RATE HEATERS

Built in five different capacities, all interchangeable without the disturbance of plumbing or permanent wiring.



TWIN UNIT

Three Heat Twin Element, Circulation Heater, recommended for localities where a flat rate is not available, and intermittent operation best suited to the requirements of the Central Station and customer. Standard design for all capacities of 2 K.W. and over.

This heater possesses a remarkable interchangeable feature in that the 3-KW 110 V., 3 KW 220 V., and 2-KW 220 V., are all interchangeable. This allows changing from a 3-KW 110 V., to a 3-KW 220 V. or from 2-KW to 3-KW in either 220 V., or 110 V., without disturbing plumbing or wiring. Simply change the elements at any desired time.

Western Sales Office:
602 Avenue Block - Winnipeg

What about the Homes without hot water

Heated Electrically by Thermo Electric Heaters

Descriptive literature and price information on request.

Thermo-Electric Installations

On the left is shown a Twin Element Three-Heat Circulation Heater. Irrespective of the temperature of the water in the boiler, and the fact that these Heaters are uninsulated externally, their remarkable efficiency is apparent from the fact that their temperature is always lower than that of the highest temperature water in the boiler which they are heating.

In front and facing the observer is a Single Unit Immersion Heater, installed in the 1" opening, commonly used for connection to water back or furnace coil. At the right a similar Heater is installed using ordinary pipe fittings as a circulation unit. On account of their remarkable efficiency and durability these Heaters have been universally adopted for continuous operation requirements.

MANUFACTURED BY

THERMO ELECTRIC LIMITED

Manufacturing Engineers

BRANTFORD — — CANADA

C N C

MILEAGE is a big talking point in the Street Railway field. It is why Columbia Pyramid Brushes are the universal choice.

Brushes for all Railway Motors

CANADIAN NATIONAL CARBON COMPANY, LIMITED
Montreal Toronto Winnipeg Vancouver

9520

C N C

When a man tells you that the breaker you have specified is "special," tell him it is not "special" for Cutter. Our aim is to keep five years ahead of all competition.

The Cutter Co.
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Also at
24 Adelaide St., E.
TORONTO

Canada Wire & Cable Co. Limited

Manufacturers of

Electrical Wires and Cables

and

Steel Wire Rope

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"Reel Service"

From Coast to Coast

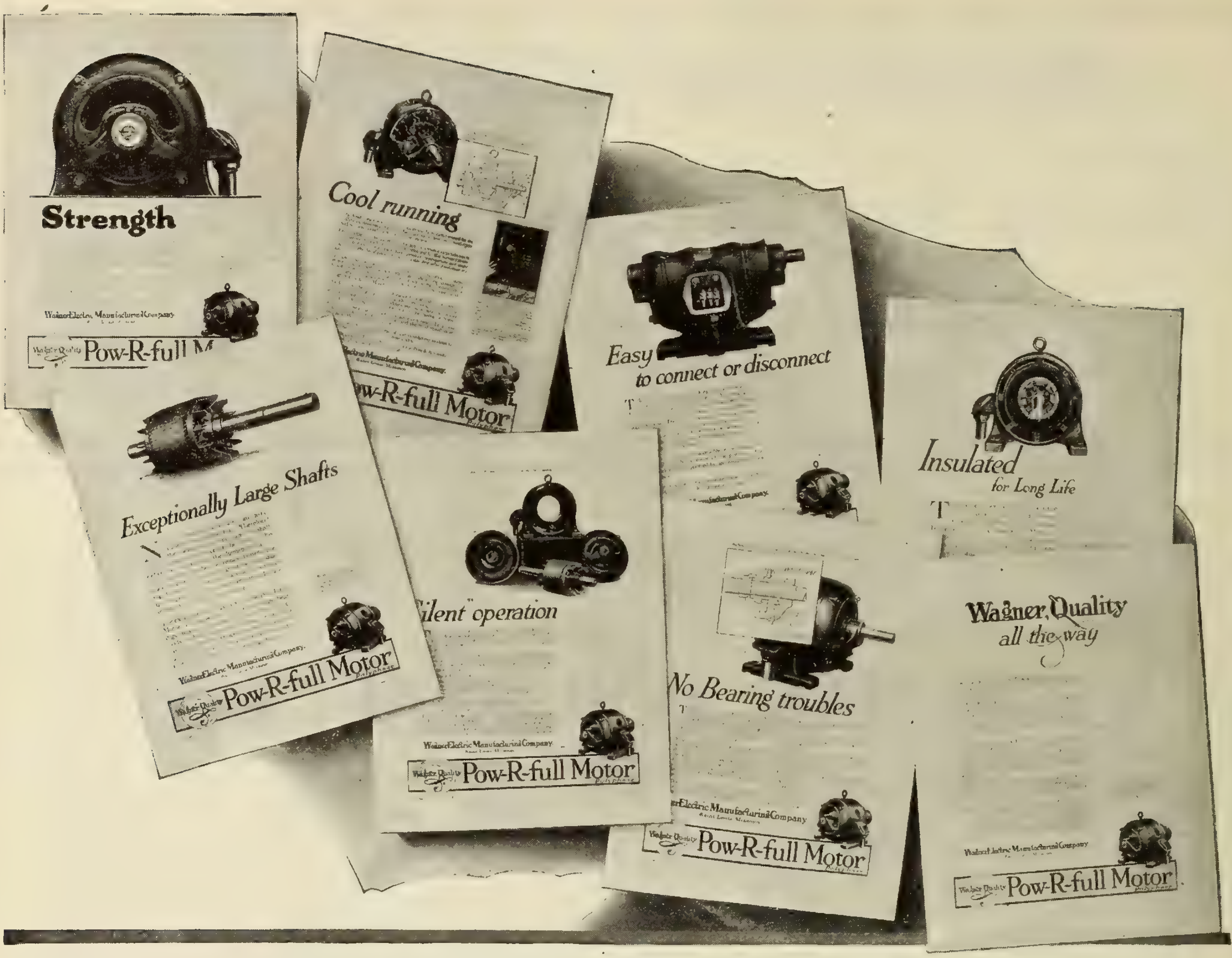
CANADIAN PORCELAIN CO.
LIMITED

HAMILTON - CANADA

Manufacturers of High and Low Tension Porcelain Insulators

The Star Porcelain Company
TRENTON, N. J.

Manufacturers of Electrical Porcelain Specialties. Also specialize in the manufacture of heater bricks for electric ranges.



Strength

Wagner Electric Manufacturing Company

Wagner Quality Pow-R-full M

Cool running

Wagner Electric Manufacturing Company

w-R-full Motor

Easy to connect or disconnect

Wagner Electric Manufacturing Company

Insulated for Long Life

Exceptionally Large Shafts

Wagner Electric Manufacturing Company

Wagner Quality Pow-R-full Motor

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Wagner Quality Pow-R-full Motor

No Bearing troubles

Wagner Electric Manufacturing Company

Wagner Quality Pow-R-full Motor

Wagner Quality all the way

Wagner Electric Manufacturing Company

Wagner Quality Pow-R-full Motor

These features please motor users

Why shouldn't they? For each and every one of them is the result of a demand on the part of these same motor users.

For over ten years our men in the field have been gathering data on what motor users want and the Pow-R-full Motor supplies them all.

These features are just what you want in your motor. Bulletin 12913 describes and illustrates many important features of Wagner Pow-R-full motors. Ask for it.

Wagner Electric Manufacturing Company
of Canada Limited-Montreal
Power Building, Montreal 217 Dundas St. East, Toronto

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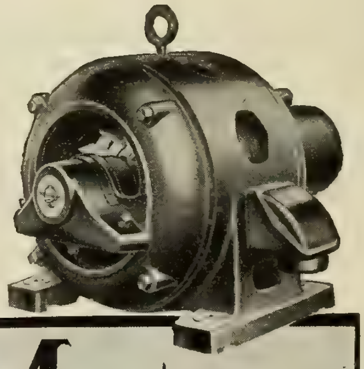

Wagner Quality Pow-R-full Motor
40° Polyphase

The "Lancashire" Induction Increases Production

LANCASHIRE

BALL BEARING

MOTORS

LANCASHIRE DYNAMO & MOTOR CO. (of Canada) LTD.
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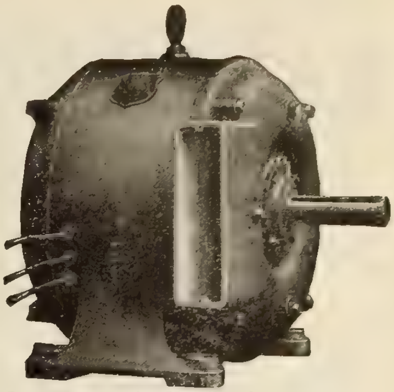

Lancashire Pipe-Ventilated Motor. For use in Cement & Flour Mills, etc.

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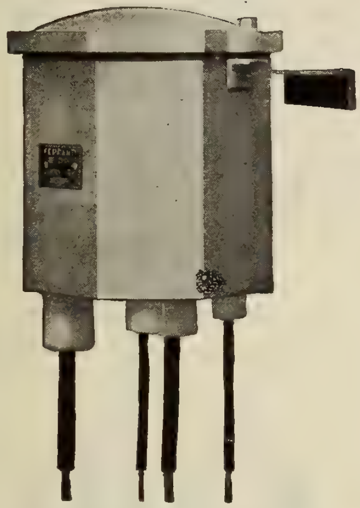

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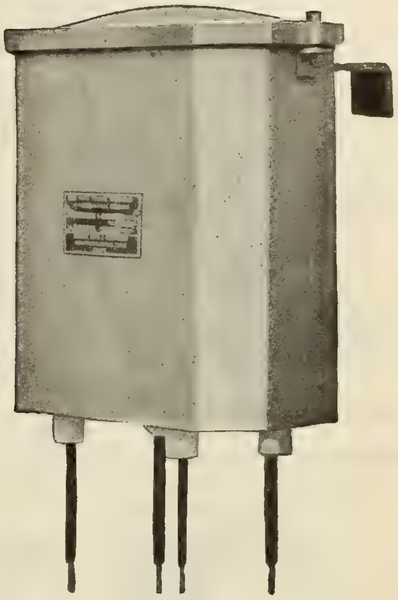
Transformers

Current and Potential for Rural Distribution

TYPE "GW" Cross-Arm Mounting, Weatherproof. Circuit up to 6600 volts. Rating 50 Volt Amperes.
TYPE "PW" Potential Transformer, Pole Mounting, Weatherproof, Single, or Three Phase for circuits up to 6600 Volts.



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Ferranti Meter & Transformer Mfg. Co. Ltd.

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Northern Ontario
J. P. Bartleman
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DOMINION ENGINEERING AGENCY, LIMITED

D. M. Fraser, Pres.

24 Adelaide Street East :-: Toronto, Ont

"I-T-E"
CIRCUIT BREAKERS
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AUTOMATIC
INDUSTRIAL
CONTROL

"S & C" FUSES
and
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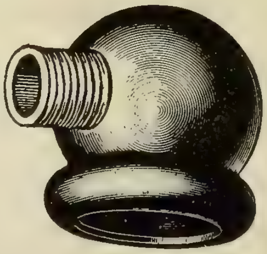
Carried in stock, as units, will permit
of making up as needed



No. 113

No. 110

No. 111

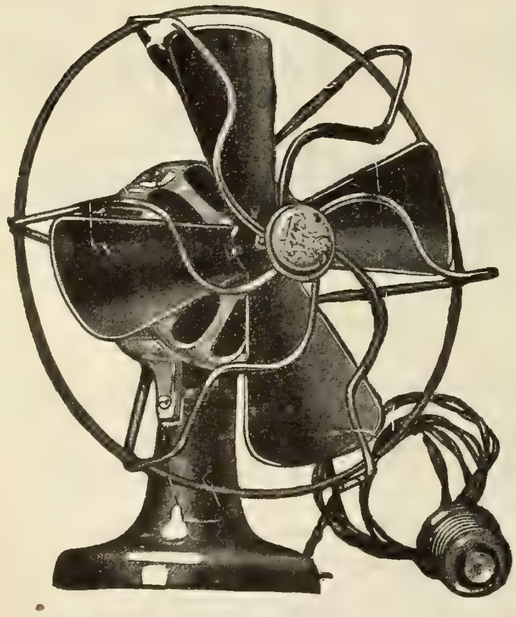
Brackets—Link—or Round End
Chain—or Pendant—Drops

Full Particulars on Request

Western Representatives:
Cochrane Stephenson Co., Ltd. - 602 Avenue Block, Winnipeg

Manufactured by

W. H. Banfield & Sons Limited
370-386 Pape Avenue - - - - TORONTO



Polar Cub
Electric Fans

6 inch size	(1 speed)	Fan	retails	-	$ 7.50
8 "	" 1	"	"	"	-	$11.25

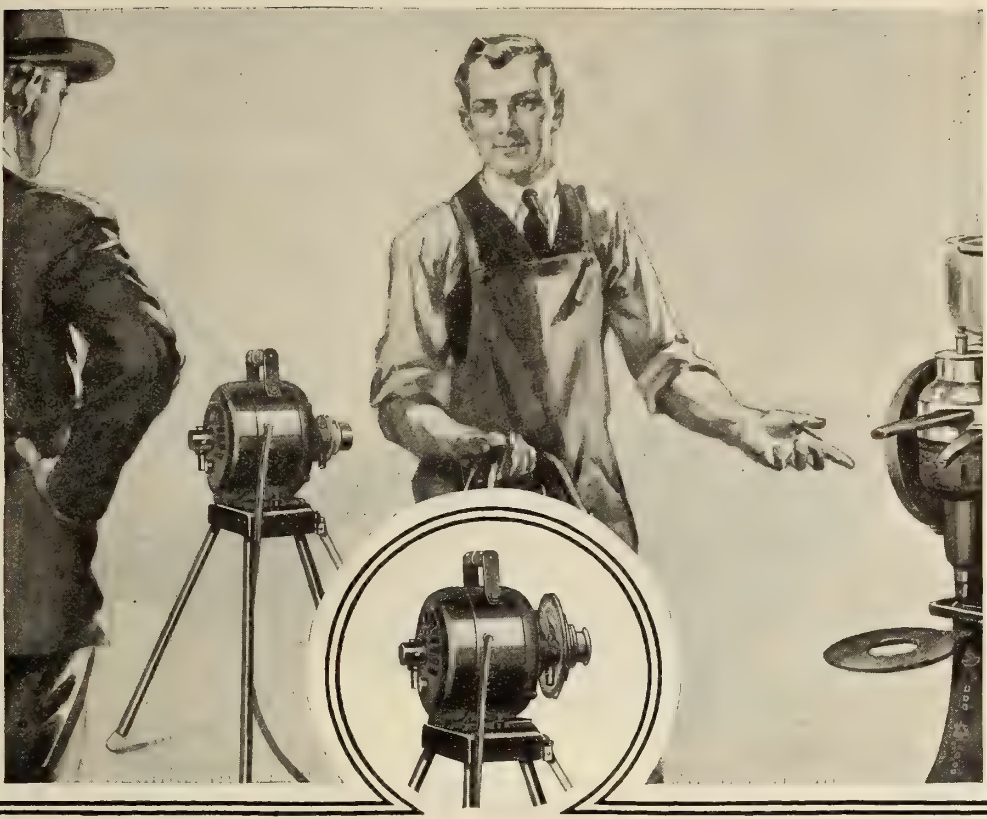
'Make hay while the sun shines' by offering this business getter to your customers at the right time. The demand is sharp; be ready for the sales.

Highly Buffed Solid Brass Blades, Reservoir Oiling System, New Guards, Improved Motor.

Write or wire your requrements.

The A. C. Gilbert - Menzies Co., Limited 439 King Street W.
TORONTO

Agents Gilbert's Wireless Sets, Radio Accessories, Polar Cub Fans and Electrical Specialties.



The extension of central station circuits into rural communities, and the development of the private plant, have made electric service available everywhere. And the portable utility motor applies this service to such tasks as turning the separator, churning, washing clothes, pumping water, cleaning grain—all such jobs which formerly meant hours of drudgery in every rural household.

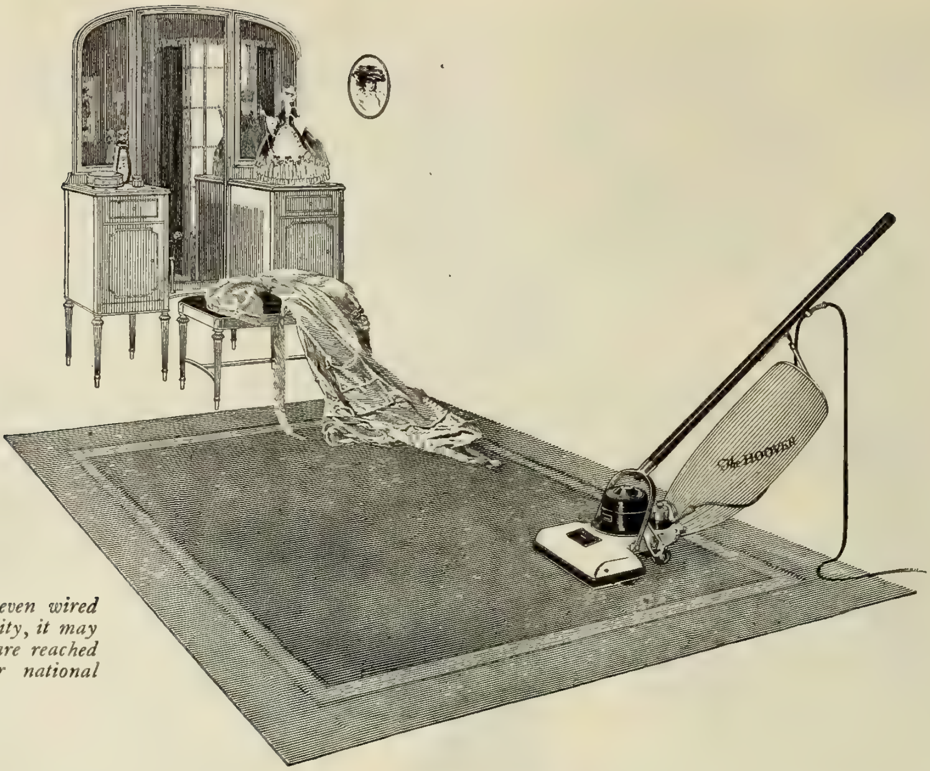
Jobbers and dealers who keep in contact with private plant salesmen, implement dealers and agents for farm appliances, find the utility motor an easy selling, profitable item.

As the pioneer motor of this type, and one of the best known and most widely used, the R & M power stand motor appeals to jobbers and dealers who prefer a product which has proved its reliability and popularity by many years of service. It is made for 32 volts direct current and 110 volts, 60 cycles, alternating current.

Descriptive literature and prices on request.

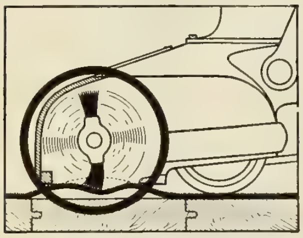
The Robbins & Myers Company
of Canada, Limited
Brantford Ontario

Robbins & Myers Motors



Five out of every seven wired homes in your locality, it may be safely estimated, are reached regularly by Hoover national advertisements

Hot Weather Will Help You to Sell Hoovers



The Hoover Brush Beats as It Sweeps

(Another Patented Hoover Feature)

MOST electric cleaners have brushes. Some are stationary; some are slowly revolved by the carrier wheels as in a carpet-sweeper; some are motor-driven. The latter are of two types, those which merely sweep and those which beat as well as sweep the rug. This second and the only effective type is covered by a Hoover patent, issued April 3, 1917. The air suction of The Hoover lifts the rug and brings it into contact with the Hoover Brush, whose soft hair tufts, as they sweep the rug crest free of clinging litter, also depress it. Air suction again immediately lifts the rug. Repeated over 1,000 times a minute, this vibrates embedded dirt to the surface. Air suction carries off the beaten-out and swept-loose dirt into the dust-tight bag. Over eighteen patents now protect The Hoover. Other applications for patents are pending.

When Old Sol sizzles overhead, pity the woman who has no Hoover!

It becomes twice as hard for her to house-clean. The heat soon fags her out. Yet the sight of dirt everywhere forbids her to rest.

Could there be a better time to interest her in a Hoover?

Many dealers have found that the hot weather offers them a splendid opportunity. August is frequently made a Hoover campaign month.

Remember, too, that fall, with its traditional house-cleaning upheavals, is in the offing, and that it is not too early to lay your plans now for that great Hoover selling season.

Get into immediate touch with us. Consider at once the Hoover Authorized Dealership. Only a small investment and a small space in your store are required. Every assistance known to us is given you to help you succeed.

On the famous Hoover Co-operative Plan, our trained sales organization will even co-operate with you to the extent of securing leads, demonstrating, selling, delivering and servicing Hoovers.

Building the best cleaners, aggressively advertising them, and intelligently assisting dealers to sell them, have made the Hoover Company the largest seller of electric cleaners in the world.

The Authorized Hoover Dealership can be made as valuable an asset to you as it is to so many other merchants. When will you discuss the subject with our representative?

THE HOOVER SUCTION SWEEPER COMPANY OF CANADA, LIMITED
Factory and General Offices: Hamilton, Ontario

The HOOVER
MADE IN CANADA
It BEATS.... as it Sweeps as it Cleans

Electrical News
Generation, Transmission and Application of Electricity

For nearly thirty years the recognized journal for the Electrical Interests of Canada.

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Orders for advertising should reach the office of publication not later than the 5th and 20th of the month. Changes in advertisements will be made whenever desired, without cost to the advertiser.

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The "Electrical News" will be mailed to subscribers in Canada, Great Britain and British possessions post free, for $2.00 per annum. United States $2.50. Other foreign countries $4.00. Single copies 15 cents. Remit by currency, registered letter, or postal order payable to Hugh C. MacLean Publications Limited.

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Pacific Coast Government Inspector and Engineer Favors Standardization of Wiring and Appliances

Mr. T. Muirhead, Inspector of Electrical Energy for the province of British Columbia, has been spending a couple of weeks in Ontario, getting acquainted with conditions there as regards approval and inspection of electrical wiring and appliances. Mr. Muirhead's office is unique in Canada, as he has oversight over all outdoor as well as interior wiring and equipment. He is also electrical engineer to the local government and in the dual capacity has gained very extensive experience of the requirements of the industry.

It is therefore of special interest to note that in British Columbia they are having the same difficulty due to cheap wiring jobs and cheap goods as they are in some of the other provinces and that Mr. Muirhead is entirely in accord with the movement for a standard of installation work as well as of electrical equipment and appliances. He is responsible for the introduction of a licensing act for contractors and journeymen in the B. C. Legislature, which as in Ontario, is still hanging fire, but is likely to be reconsidered next session. He is also of the opinion that, although there may be some difficulty in arriving at an absolute standard, there should be little difficulty in reaching a satisfactory working arrangement so that the needs of the industry may be served.

The electrical industry is, in a sense, a paradox. Though admittedly a prime factor in providing relief for human ills there is also associated with its use a very considerable hazard. Where the electrical hazard is prominent its effectiveness in providing relief is minimized. It is thus essential that we do everything in our power to make the use of electricity safe and foolproof and, to this end, the men who instal equipment must be capable and dependable, while the equipment itself must be of the highest grade. Public safety demands a legalized safe standard in both.

Ontario Hydro-Electric Commission Issue Report on Nipigon Plant

The Hydro-electric Power Commission of the Province of Ontario have just issued an interesting report on the Nipigon development, which is located near Fort William and Port Arthur in what is known as the Thunder Bay District. The booklet deals with the natural resources of this district, the rapid growth in demand for electric power and the pressure brought by the municipalities, upon the Commission, to provide an adequate supply so that future needs may be taken care of. The various power interests in the neighborhood are described in some detail and reasons advanced for the choice of Cameron Falls on the Nipigon River where 50,000 h.p. is available. The Dog Lake development, or Silver Falls, as it is sometimes called, was not favored on account of its less limited capacity, this matter being summed up in the following paragraph:—

"The studies made by the Hydro-electric Power Commission led to the conclusion that the cost of developing even 30,000 h.p. at unity load factor on the Nipigon River, would be but little greater than the cost of making a similar development at the Dog Lake site. And, moreover, the Nipigon development would be capable of future enlargement to take care of larger power requirements than would be the case with the Dog Lake Development, limited as it is to an ultimate development of from 18,000 h.p. at unity load factor to 30,000 h.p.

The Commission has been criticized on two scores, and this report deals with both: (1.) It has been said that the contract should have been renewed with the Kaministiquia Power Co. (2.) The Nipigon development has been criticized on the score of cost, which makes the power rate greater than would have been available under contract with the Kaministiquia Company. In connection with (1.), the report claims that the power survey made by the Commission established beyond question that the Commission was correct, not only in its appraisement of the power demands of the near future for the Thunder Bay District, but also in its conclusion that these demands could not be met by the Kaministiquia Power Co. from its present site. As regards (2.), it is admitted that the cost of the Nipigon plant as on January 13-31, 1922, is about a million and three-quarters greater than the estimated cost in 1919, but in extenuation it is stated that the date of starting the work was delayed, which meant that when finally started, it had to be rushed at extra expense; that the cost of labor required for the construction of the plant increased approximately 46.5%, totalling for the whole job about $1,350,000, and that the cost of materials used in the plant increased approximately $600,000 over the cost prevailing at the time the estimate was made.

Chapter 2 deals with the advantage of Hydro-electric Power at low rates supplying extensive and expanding markets, and Chapter 3 covers in some detail the natural advantages of the twin cities of Port Arthur and Fort William. An appendix contains a brief description of the hydro-electric development itself.

Winnipeg Power Lines and Distribution System Crippled by Severe Wind Storm

Electrical services once again suffered an interruption due to a terrific wind storm that hit the city about 3 a.m. on June 23rd. A great amount of damage was done to buildings in the city and surrounding country, several lives being lost. The transmission lines of the Winnipeg Hydro and the Winnipeg Electric Co. were again crippled, the street railway lines especially suffering damage to the extent of 42 towers being levelled to the ground at Lydia, which place had just recovered from the effects of the previous storm. The Winnipeg Hydro line was hit about 20 miles away from the breakdown experienced at Milner, Tyndall district being picked out by King Boreas for its share of the damage. Fortunately the Hydro towers were only down on one of the transmission lines, the other line remaining intact with the exception of the circuit being blown from the insulators in several places. On No. 2 line a number of towers were levelled to the ground although only four were crippled; consequently, the work of re-building will not be as difficult as the first reports indicated. Owing to the extensive damage in the city to the distribution system, service was withheld until 5: 45 P. M. in order to give the line gangs every opportunity of making safe the wires which were lying about in all directions. With the exception of some of the outlying districts and isolated cases normal service was restored by the following morning. The Winnipeg Electric Railway lines were badly hit owing to the large number of towers they had down and also trouble at the standby plant; consequently it was only possible to render a limited service until Sunday morning when a temporary circuit on the transmission line was put into operation. Never in the history of the two power services in Winnipeg have they experienced such climatic conditions as they have had this year, and it has naturally brought the question of a standby plant for the Winnipeg Hydro once again to the fore and every effort is being taken to have the work speeded up. However, it is pointed out that even if a standby plant had been in existence at this time only a very limited service could have been given owing to the badly crippled state of the distribution system. In addition to the damage in Winnipeg the surrounding country in Western Manitoba, suffered severely, especially the town of Portage La Prairie where a great deal of damage was done by wind and fire, three of the large flour mills being practically destroyed. In addition, the transmission between Winnipeg and Portage La Prairie was blown down for a considerable distance.

Feed line wrecked by storm—McPhillips street, Winnipeg

School Children and Safety

About April 1st, the Ontario Safety League announced a competition for the best essays by school children in the Province of Ontario, on the subject "How Children May Help to Avoid Motor Accidents." Cash prizes amounting to $200. in all were donated by the Ontario Motor League. This amount was divided into one hundred and forty prizes, varying in value from ten to one dollar in order to give, as far as possible, equal chances to all. The prizes were divided into two classes—

Class A, for children 12 years and under.

Class B, for children 13 years and over.

Many lives are lost every year on account of reckless driving, and thoughtlessness on the part of pedestrians, and experience has shown us that accidents involving automobiles and children can be materially reduced by teaching children how accidents are caused and how they should be avoided.

Annually, for a number of years, the Ontario Motor League has been donating money for these essay competitions. Up to this year six hundred has been the largest number of essays received in any one year. It is therefore very gratifying this year to have received 2,600 essays in competition for these prizes. Not only is this gratifying, but it is a matter of congratulation that a number of towns in Ontario, and a number of schools, who have never competed before, have this year entered the competition.

Steam Stand-by for Winnipeg

Considerable discussion is going on in Winnipeg in connection with combining a central steam heating plant with the proposed Hydro standby plant. It is thought that owing to the long winters this city is admirably suited for the establishment of a central steam heating plant. These have been in operation on the Pacific Coast for some years in such cities as Seattle and Spokane. A proposition was put forward some years ago by a company who requested a franchise from the city for the privilege of operating a steam heating plant. Owing to financial conditions, however, nothing was done. Included in this proposal was an offer made to the city to sell them a standby service for the Hydro Department. This covered the use of a block of power of about 10,000 h.p. capacity in case of a break-down in the hydro-electric service. The city, however, is now committed to the building of a standby plant of its own and is therefore no longer interested in such a proposal. However, there are certain features of the central heating scheme which are worth consideration and it might be possible to plan the standby plant so that a central heating scheme could be embodied with it at a later date.

Our Apologies

In the report of the C. E. A. convention in our July 1 issue we referred to the representative of the N. E. L. A. as Mr. Whonken. This was a typographical error and should have read Mr. W. H. Onken.

Our report of new officers also mentioned a first, second and third vice-president. We are advised that the constitution has been amended in this respect and that all the vice-presidents, i.e., Messrs. Doddridge, Pratt and Beaumont, have the same standing.

On July 7, the Royal Mail liner Orbita was successfully navigated through a narrow channel leading to Portsmouth harbor by electrical signals from the Admiralty's submarine cable laid twenty miles out to sea with the object of lessening the fog peril near the harbor. The Orbita up to the present time is the only ship on which the necessary equipment has been installed.

Successful Midsummer Convention of Ontario's Hydro Engineers

Niagara Falls an Ideal Location for a Judicious Admixture of Business and Sociability

The Association of Municipal Electrical Utilities holds two conventions each year—one in midwinter, generally in Toronto, and one in the summer, which so far has always been held at Niagara Falls, partly on account of the natural lure of the place and partly, doubtless, that the delegates may have an opportunity of looking over the Chippawa-Queenston development plant which is always a feature of the midsummer convention. These conventions are very fully attended, representatives being present from practically every municipallity where the Hydro operates. In a number of cases the commissioners attend as well as the engineers. In point of attendance this year's convention, held in the Clifton House on the 22nd, 23rd and 24th of June, was no exception.

A. M. E. U. conventions are a good deal like other functions except, perhaps, in the one feature that they never try to crowd too many items on the programme. Time is allowed for discussion, for sociability and for entertainment. Following the address of the president, Mr. M. J. McHenry, of Walkerville, and the report of the secretary, S. R. A. Clement, and the treasurer, G. J. Mickler, the first ray's proceedings consisted largely of an address by Dr. Hastings, Toronto's Medical Health Officer. The doctor's lecture was interesting as well as delightful and in the discussions that followed the delegates were very loath to leave a subject that possessed so much of interest for all of them.

Friday's proceedings consisted in the reading of papers by R. C. McCollum on "Some Peculiar Phases of Allocation of Charges for Municipal Electrical Utilities;" by M. B. Hastings on "Modern Street Lighting from Construction and Apparatus Standpoint," and by R. M. Love on "Modern Street Lighting from Illumination Standpoint." Mr. Wills Maclachlan spoke in the interests of the consistent use of safety devices and steady practice in life-saving exercises. Mr. K. A. McIntyre also spoke in the interests of the Society for Electrical Development, of which he is the Canadian representative.

Convention Dinner

The A.M.E.U. programme always includes one get-together dinner, of which one of the chief characteristics is its freedom from formality. Everybody attends and everybody enjoys himself. This dinner is unique in many ways and is only made possible by the fact that the members of the Association know one another thoroughly, and in many cases intimately, so that the function takes on the appearance of a reunion. A number of the delegates have very fine voices and these were much in evidence during the evening. The dinner was followed by a number of excellent addresses, among the speakers being Hon. I. B. Lucas, Commissioner Ellis of Hamilton and others.

Contractor-Dealers in Attendance

It had been arranged for the Contractor-Dealers' Association of Ontario to hold an executive meeting in Niagara Falls at the same time so as to meet with the central station men, and the presence of Mr. McIntyre the first president of the Association, was taken advantage of by the members of the Executive to make him a little presentation. As a result there now hangs from his waistcoat pocket a very handsome watch fob, suitably inscribed. Simultaneously, it was announced, a bouquet of flowers was being delivered to Mrs. McIntyre in Toronto. The presentation was made by Mr. Harry Hicks, the present president of the Ontario Association of Electrical Contractors and Dealers.

Friday Afternoon's Session

Friday's business concluded, the delegates repaired to the baseball grounds where the Hydros battled with the Commercials. The Convention Bulletin reports the score 127 to 121 in favor of the Hydros, and incidentally, we want to add our word of congratulation to the Editor-in-Chief and his assistants of this Bulletin who so successfully, under great difficulties, got out a four-page printed folder on both Friday morning and Saturday morning. The responsibility of this work fell largely, we understand, on the shoulders of Mr. J. E. B. Phelps, with Charlie Hopper as first assistant. The items printed were of real interest. They included a list of the members registered, and a number of very snappy short articles one of which was entitled "The Famous Fishing Trip," written, we understand, by three prominent members of the fishing party no one of whom had any knowledge that the others were also writing the story. As a consequence the versions did not check up at every point. On the whole it may be said, however, that the three stories constitute a very complete, if contradictory, report of what must have been—to look back upon—a very interesting vacation.

On Friday evening the delegates were left to follow their own inclinations—which led in various directions. Saturday morning was taken up with an inspection of the canal and the new power house where the two 55,000 h.p. units are now operating. Next year when they meet in June and make the same trip it will probably be five.

Manufacturers' Exhibits

The exhibit of manufacturers' equipment was unusually attractive. The following firms were represented:

Packard Electric Company; Hoover Suction Sweeper Company; Moffat's Limited; Canadian General Electric Company; Easy Washing Machine Company; Standard Underground Cable Company; National Electric Heating Company; Ferranti Meter & Transformer Company; McClary Manufacturing Company; Canadian Edison Appliance Company; Chamberlain & Hookham Meter Company; Square "D" Company; Winter-Joyner Limited; N. Slater Company; Mr. H. E. Timmerman; Robbins and Myers Limited; Addressograph Company; Canadian Westinghouse Company; Mr. Hustwitt; Nineteen Hundred Washer Company; Sangamo Electric Company; Brantford Washing Machine Company.

If we who are engaged exclusively in the electrical game are to hold and extend the appliance business, we must all face the situation squarely and adopt attractive measures to gain an increased volume of sales.

Some Peculiar Phases of Allocation of Charges for Municipal Electrical Utilities

By R. C. McCOLLUM*
Auditor Hydro-electric Power Commission of Ontario

When the Uniform Accounting System for Municipal Electric Utilities was issued in 1912 and revised in 1915 it was essentially an adaptation of the accounting systems which had been practically standardized by the Interstate Commerce Commission of the United States and by the most prominent of the Public Utility Commissions at that time, notably New York and Wisconsin.

These systems came into being simultaneously with the demand for some sort of control over the rates charged by private companies for service dependent to some extent on franchises granting the right to use the public streets and the practical elimination of competition, a condition lending itself very readily to extortion and discrimination, with no right of redress or method of relief.

Laws were passed in various States and by the Federal Government at Washington placing some measure of control of rates in the hands of Public Utility Commissions, which were empowered to hear evidence, study operating reports and statistics and finally order rate revisions.

The first essential to the intelligent operation of such a Commission was a standard or uniform accounting system by which balance sheets and operating reports of operating companies could be compared, and the improper loading of expenses more readily detected, and the result was the evolution of a uniform accounting system so clearly and precisely outlining a reasonable and rational practice, and so clearly adhering to the unalterable laws of economics, that except in the choice of language all of the accounting systems of which I have knowledge are practically similar and interchangeable.

Protection of Consumers

It will be noted from the above that the Uniform Accounting Systems were evolved primarily for the protection of the consumers rather than the owners of the utilities concerned, and it was but logical that the Hydro-Electric Power Commission, acting as the agent or trustee for the municipalities and through them, the consumers, should have adopted the Accounting System as already developed for privately owned utilities, making such modifications as were necessary to eliminate returns on capital stock and at the same time provide for the amortization of the plant cost by means of the annual principal and sinking fund payments on debentures.

However, the working value of an accounting system, embodying as it does the best collective judgment of many practical and experienced engineers and accountants, was quickly realized by all large public service companies, who no doubt would have adopted some uniform accounting system for their own protection long ago, quite regardless of governmental regulations.

Most of you are already familiar with the Commission's "Uniform Accounting for Municipal Electric Utilities" and the method followed of dividing it into three sections to permit a practical application of identical principles to large, medium and small municipalities, and while in each case the text is plain and understandable to the average reader, its use presupposes a working knowledge of practical bookkeeping. As in everything else in life, knowing how a thing should be done, and being able to do it, are two very different things.

An Effective System

The function of any accounting system is to reflect or mirror in a form so condensed that it will make a clearcut impression on the human mind, the cost of a plant, the money value of same, the financial result of operation of the plant for definite periods and the cumulative result of operation to date. All effective accounting systems must do this, and refinements or subdivisions are added according to the desire of the management for detailed analysis.

As an illustration, a man might build himself a house, paying all the bills as they came in from a special bank account, and when the house is finished his bank balance will show the cost to have been, say, $5,000.00. This may answer all his needs for the present, but if he undertakes to build another, he cannot plan as intelligently or efficiently as his neighbor who knows just how much of his $5,000.00 house is represented by excavation, masonry, rough lumber, finishing lumber, hardwood floors, roofing, heating, plumbing and painting, etc., nor can the young couple who face embarrassment in meeting a monthly living expense of $125.00 out of a $100.00 income set their finances in order until their expenses are so analyzed that essentials and luxuries can be definitely determined and retrenchment intelligently planned. The same rules are equally applicable to big business—we should know, the Bacon's observation that "a little knowledge is a dangerous thing" is as truly applicable to bookkeeping or accounting as to everything else.

Briefly stated, all expenditures fall naturally into four principal divisions:

1. Plant or Capital;
2. Maintenance and Renewals;
3. Operation and Administration;
4. Interest and Debenture Payments.

In addition to the actual money expenditures enumerated above, a provision is made for providing revenue from the date a plant becomes alive to replace or restore each unit making up the plant, when it becomes economically irreparable, and in actual practice this has been assumed to include obsolescence as well.

The general rule governing the allocation of capital is simple—embracing all items having an expectant life of more than one year, and the rule governing proper maintenance is equally simple at first, but the complications which finally develop in the handling of the accounts when a distribution system is being rebuilt to accommodate a change in load, and when the maintenance accounts are taking care of actual renewals or replacements, can be realized only by those actually in charge of such work.

What the Accounts Should Show

I said above that the accounts should show the plant cost and its money value. These are by no means synonomous things, but it is a more or less neglected factor in many private companies as well as in practically all municipal utilities, and the relations between the two in theory are continually in a state of flux. Tangible values should always be segregated from intangibles, but the total of the two should show the total outlay on capital. Plants may be abandoned, by reason of obsolescence or change in load, and where this is done, the cost should be taken out of active capital and carried in an obsolescent plant account. Pole lines may be taken down, and even if the material is salvaged, the labor erecting and demolishing is no longer tangible property, and except in unusual cases where there is special revenue to set against such cost, the amount should be still carried as intangible capital. The charging of such items to expense is unfair to the consumers of that year, destroys the continuity of the operating record, and especially in municipal systems where rates are yearly adjusted on a cost basis is demoralizing.

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*Before A.M.E.U. Convention.

We will consider, first, the case of a distribution system designed to provide for a normal balanced lighting and power load, which after a few year's use, in order to provide for several large power customers, has to be practically rebuilt. Granting that most of the material can be used, all of the labor in the original construction and in dismantling no longer represent value, and should in theory be eliminated from tangible capital, and other material, such as crossarms, while still good for some year's service, is discarded as not justifying the labor of replacing for its short remaining life.

Under no circumstances can we justify a maintenance charge against revenue of more than twelve months' ordinary wear and tear when full theoretical depreciation is also being provided for, so that it would appear quite logical and about the only practicable plan to allow original labor and overhead to remain in capital, capitalize so much of the new material and labor as went to increase the capacity of the plant, as nearly as can be determined, and charge the balance to the Depreciation Reserve, even up to the point of its entire depletion. Such a plant being practically new, can stand in the balance sheet without much accumulated reserve and not be subject to particular criticism. In actual practice, however, it will be found that no hard and fast rule can be adhered to, and as is so often the case, good common sense must govern.

Renewals

Under the classification the consumers are required to provide out to revenue for the current maintenance of the plant, and also for the ultimate replacement of each unit. An average rate has been set for this based on the average economic life of the various units of the plant, but so far no account has been taken of the increased life due to maintenance. For instance, a meter having a life expectancy of twenty years is rejuvenated periodically by cleaning, oiling and possibly the replacing of jewels and coils, so that its actual life far exceeds the estimate. A pole taken into account on a twelve year life basis may, and in cities and towns with proper drainage, usually does complete a life of more than double that time, or it may be cut and reset in a different location with an additional life of many years.

Experts Prove Anything

In a general way plant life expectancy on which depreciation rates are computed, is based on evidence of so-called experts before Public Utility Commissions in rate adjustment hearings, when it is to the interest of the private companies to justify high rates by proving rapid depreciation of plant. We have probably all observed in recent hearings in which we have more than a passing interest, that any contention can be proven by the testimony of experts. At any event, the burden of proof that the figures submitted by the experts were extravagant has always been on the Commissions, with the result that they usually allowed the benefit of the doubt, and the official records may be reasonably considered as ultra conservative.

The result of all these conditions is that our authorized depreciation rates normally build up an adequate reserve long before the time when actual replacement becomes necessary and to prevent an unfair loading of expense against revenue, the actual maintenance expenditures should be carefully scrutinized, and that part of the expenditure which extends the life of the units affected should be charged against the Reserve, leaving in maintenance only a normal twelve months' wear and tear. This also is largely a matter of good judgment and common sense, taking the conservative position in case of doubt.

No Labor Charge

There is another factor which has a very important bearing on this matter in the average Hydro Municipality, excepting only the very largest and smallest places, and that is that ordinarily all extensions to plant and all renewals of same are made without labor charge and include only the bare cost of the material. The reason for this is that in the average municipality there is an irreducible minimum of staff who are charged to the third general heading, "Operation and Administration," and the normal extensions to the plant and maintenance work are taken care of incidentally without additional expense by the operating staff, who are indispensable regardless of such work. As a matter of fact, excepting only the very large and very small places where men are engaged specifically for this work, there has been practically no labor incorporated in the cost of additions which have been made to the municipal plants since the systems were first made alive.

Assuming that on the average about 50% of the cost of the original plant consists of labor, it follows that as no additional labor is required when replacement is made, the ordinary depreciation rate so far as it applies to the original plan, is about twice the actual requirement, or what it need be.

In the operation of an electric utility or a telephone system, made up of a large number of relatively small units, there is a point beyond which actual depreciation cannot go and the plant give satisfactory service. Renewals of small parts, automatically charged to maintenance, and the constant addition of new material in extensions, tend to retard, and at some point definitely arrest the progress of depreciation. In a recent hearing where the rates of the New York Telephone Company were under revision the New York Public Utility Commission, 1st Division, a body whose judgment will be respected by all other similar bodies, recently ruled that thirty per cent. of the tangible depreciable plant value was the maximum depreciation reserve that could be justified in a balance sheet. This closely follows the evidence given in the recent hearing of the application of the Bell Telephone Company at Ottawa for an increase in rates, when their application was refused by the Dominion Railway Board.

Depreciation Fund Too Large

In many Hydro municipalities the accumulation of depreciation reserve in less than ten years' operation already approximates this percentage, and if we add the free surplus, frequently exceeds it, and it is altogether likely that before long the depreciation rates will either be revised downwards or a maximum fixed which will have the same effect.

In one important essential the requirements of the accounting systems governing the operation of the Hydro-Electric Power Commission and the Hydro utilities differ from those controlling private companies in that they include as an operating charge the principal and sinking fund payments on the debentures, which a private company never does, and remember, when making comparisons with prices quoted by private companies, that you are automatically acquiring complete ownership of the generation, transmission and distribution system. In many municipalities a debt free local plant is already in sight and the balance is a matter of mathematical calculation. There is some satisfaction in planning such a heritage for our children.

The accounting system is in its way as essential to the success of the Hydro as the supply of energy, because its economic success is dependent on an accurate knowledge of what is taking place. Every Commissioner, Manager, Secretary or Representative of a Hydro utility in any capacity should have a general understanding of the principles of the accounting system, and should be so familiar with the municipal section of the annual report that he can obtain from it without effort, any knowledge he requires for his own information or for the benefit of his friends.

If you have a reasonable question about your operation, the answer should be in this book. If it is not, make it your business to find out why.

Discussion on Mr. McCollum's Paper

The discussion on Mr. McCollum's paper was largely around the matter of reserves. Mr. Ireland led off by remarking that he did not see the necessity for the present generation both paying for the plant and also providing a fund with which to buy a second plant. If we paid for the plant and handed it over to the next generation in a proper state of maintenance, posterity should think themselves well treated. In any case he did not see that we were called upon to build up a reserve of more than 30 to 50% of the replacement value of the plant. A number of the delegates expressed similar opinions on this point, the majority of them not favoring building up a replacement reserve.

Report of the Various Sub-Committees of the Merchandising Committee

By G. J. MICKLER*

At a joint meeting of Inside and Outside Merchandising Committees held on January 25th, 1922, at the Offices of the H.E.P.C. there were formed four Sub-Committees as follows:—Purchasing Committee; Educational & Advertising Committee; Servicing Committee; Accounting & Collections Committee; and each of these Committees was instructed to look into the problem of furthering the interests of the Hydro Municipalities in merchandising matters, and to submit suggestions for properly conducting the Merchandising Campaign. Following this Meeting the Purchasing Committee met on January 26th, and it was decided to obtain from all Municipalities selling merchandise, a Specification of their sales for the year 1921, as well as a schedule of the probable sales for 1922, upon which could be based an estimate of the probable total requirements of all Hydro Municipalities for this year. In response to an appeal to the Hydro Shops for this information all but one or two sent in the information, which was compiled and used as a basis for further consideration of the problem of buying supplies for Hydro Shops through the Purchasing Committee.

The Purchasing Committee held a Meeting on April 20th, and were presented with the compiled list of Specifications for the Hydro Shops for the year 1922, and discussed ways and means of approaching manufacturers of the various appliances manufactured and supplied, with a view to obtaining the very best prices on the amount of business set out in the schedule. After thoroughly discussing the problems confronting them, it was decided to leave the matter to the Purchasing Department, in whose hands the question of obtaining prices still stands. Before overtures could be made to the manufacturers, some definite plan governing the merchandising activities of the H.E.P.C. was necessary, and bearing this in mind a Meeting was called of the Educational Committee, to discuss the proper methods of conducting an Advertising and Educational Campaign in Ontario.

The Chairman of the Educational Committee submitted a detailed Report of suggestions as to the proper way of conducting an Educational Campaign and with these suggestions several advertising agencies were approached and asked to submit propositions along with the probable cost of Campaigns to cover the Hydro requirements. Two such propositions are at present under consideration, and should they meet with the approval of the Commission, the Municipalities will be notified in due course of their complete operation, and the co-operation of all Municipalities in carrying out the plans is earnestly asked for.

The Servicing Committee held a Meeting on January 26th, and discussed the principles which should govern the servicing of appliances in the Hydro Municipalities. The deliberations of this Committee are not quite complete and when the full programme has been definitely decided on, it will be presented in the form of a pamphlet for reference to every Hydro Shop.

The Accounting and Collections Committee have not yet held a Meeting, but information has been collected on accounting methods employed in Hydro Shops and in similar lines elsewhere, with a view to getting the best that could be had for the purpose, and Accounting Systems to take care of the Merchandise Departments were installed in a number of municipalities along these lines as a trial, after the operation of which, it is expected printed instructions will be issued to the Hydro Shops, to carry on their Accounting in this way.

Discussion

One of the delegates inquired "What is the nature of the articles which the different Hydro shops merchandise, and do they intend to extend the list and embrace more articles than they have to-day, and also are they in competition with other jobbers?"

Mr. Mickler: "Up to the present time, the Hydro Commission has taken it upon themselves to sell to municipalities whatever the municipalities require. So far as I know, every electrical appliance that is manufactured is within the scope of the Commission's activities. So far as the second part of the question is concerned, we are in active competition with jobbers, but not with manufacturers."

Engine Driven Welding Equipment

An engine driven welding equipment for use where electric power for motor drive is not available and for job welders who must work in widely scattered districts has been developed by the Westinghouse Electric & Manufacturing Company. This apparatus, which is made in stationary and portable models, also has the advantage of making it unnecessary to waste time applying for a permit or making proper connections before work can be started. The equipment consists of a Westinghouse single operator welding generator geared to a Doman four cycle, two cylinder, low speed, marine type gasoline engine. The generator is direct current, has a rated capacity of 175 amperes, and a maximum capacity of 225 amperes, at 1,750 r.p.m. The generator is designed to operate at arc voltage, and to inherently stabilize the arc and supply a substantially constant current of different values over the working range of 90 to 225 amperes. The operating characteristics of the generator are such that it is easy for the operator to strike and maintain the arc, and also to obtain the deep penetration and thorough fusion necessary for satisfactory welding. The shaft of the generator extends through the pedestal bearing and is connected by means of a flexible coupling to the exciter.

The control panel is mounted directly over the generator on a rigid, light weight angle iron frame work, and the entire equipment is mounted on a substantial cast iron bedplate.

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*Treasurer, A.M.E.U.

The Application of Electricity in the Manufacturing Industry---3

A Review of the Pulp and Paper Resources of Canada With Special Reference to the Utilization of Our Water Powers

The manufacture of pulp and paper is one of Canada's outstanding industries and the normal progress during the past few years is an indication of the rapid expansion which may be expected in the future. According to the Bureau of Statistics figures for 1920 the pulp and paper industry in Canada represented a total capital investment of $347,553,333, found employment for 31,298 persons whose yearly wages and salaries amounted to $45,253,893, while the value of the products totalled $214,421,546. The export trade of $120 in 1890 for this industry is often contrasted with the present corresponding figure of over $100,000,000, to demonstrate the remarkable expansion during this period.

The Importance of Cheap Power

The question of motive power in connection with the production of pulp and paper is a most vital one and, in fact, is almost as important as that of raw material. In any industry the relative necessity of obtaining cheap and adequate power may be gauged by the amount required per dollar of product and with the possible exception of certain electro-chemical and metallurgical processes, the requirements for pulp and paper are among the highest. The importance of cheap power may be judged from the fact that it takes practically 100 h.p. to make a ton of paper per day. It is, therefore, little surprising that motive power used in this industry is practically restricted to hydraulic energy and Canada's supremacy in the pulp and paper field rests on adequate and abundant water powers well distributed among extensive forest resources.

A few general details are here given to show how this large amount of power is consumed in the operation of pulp and paper mills. Average figures in connection with a large Canadian mill show that mechanical pulp requires 73 h.p. per ton of daily output of which 67 h.p. is for grinding alone; sulphate pulp requires 8.7 h.p. per ton of daily output, and in other large mills as high as from 20 to 30 h.p., while the production of newsprint from pulp consumes 12 h.p. for the same unit output. Continuous operation of mills in this industry, usually 24 hours per day, permits a very advantageous use of the necessary power and with direct water power or hydro-electric energy further allows a cheap unit cost for the amount consumed. For instance, one of our Canadian sulphite mills with an installation of 1,500 h.p., purchases hydro-electric power on the basis of $1 per h.p. per month plus a consumption charge on a sliding scale, and it was found that the minimum rate of 0.1 cent per kw.h. could be taken advantage of for about 75 per cent of the total consumption, thus reducing their unit power cost very materially.

Water Power Installations for Pulp and Paper Industry

In view of the very prominent place which the pulp and paper industry has acquired in Canada and further, of the important part which our water power resources are playing in the development of this field, the Dominion Water Power Branch recently undertook a special study in this connection and has gathered much information on power installation and requirements at pulp and paper mills operated by water power or by purchased hydro-electric energy. For the sake of brevity the general term "pulp and paper mills" has been adopted throughout this review and in the tables as including **pulp** mills, **pulp and paper** mills, and **paper** mills. The principal power and other features are presented in tabular form.

The water-power installation for the operation of pulp and paper mills in Canada aggregates 476,503 h.p. while the additional hydro-electric energy purchased for this industry is 160,577 h.p., giving a total of 637,080 h.p. This covers the energy derived directly or indirectly from water power but does not include mills where steam only is used as motive power. The use of steam as a source of power in this industry is very limited and in most cases is prompted by special conditions such as operation in close connection with the manufacture of lumber when refuse from the latter can be used as fuel under the boilers. The census returns (1920) show a total steam power installation in pulp and paper mills in the Dominion of only 62,400 h.p. and if the capacity of the three or four larger steam operated mills where special conditions obtain is excluded, the remaining unit capacity works out to a very small amount.

Electric drive is an important consideration in this industry. Of the total water-power installation for the various mills a total of 178,911 h.p. is converted into electrical energy before it is used to operate the pulp and paper machinery. The advantages of electric drive are numerous; a uniform speed is assured which is of primary importance in governing the quality of the product; it also allows the centralized operation of a large mill receiving power from several hydro-electric sources while a closer study of power conditions, adjustment and consumption is permitted. A well known authority on pulp and paper mill operation in Canada recently stated that the proper way to build a paper mill was to develop the power as a hydro-electric project and locate the mill at a place most suitable from the operating and shipping point of view, adding that the time for direct connecting of turbines to grinders was past.

Water Power Installation at each Mill

Table No. I presents a complete list of pulp and paper mills in Canada operated by water power showing the principal features in connection with the motive power installation. Column 1 gives the name of the owner or company operating the mill. The name of the river from which power is obtained is shown under Column 2, and the location is given in Column 3, while the head of water utilized in the development is given under Column 4. The number of turbine units installed to operate the mill and their total capacity, given in Columns 5 and 6, bring out the principal points in connection with power requirements of the mill and give an idea of its importance while its efficient operation may also be judged from the average size of each turbine unit installed. A number of mills, while producing their own power, convert the whole or a portion of the latter to hydro-electric energy before using it throughout the mill; as this is an important feature in modern operation, mills where such conditions exist are marked (e). There are a number of cases where the hydro-electric power used at the mill is generated quite a distance from it, this practice being made possible through the ease with which the electric energy can be transmitted. In most instances, the pulp and paper mill is installed at a water-power site and when gradual expansion has necessitated additional motive power, another nearby hydraulic site has been developed and hydro-electric energy transmitted to the mill to permit centralized operation. In the Lake St. John district in Quebec province one of the large mills receives energy from two hydro-electric plants located a few miles away and operated by the same company in addition to the water power developed at the mill itself. In addition to the power produced for the particular purpose of operating the mill many pulp and paper organizations in Ontario and Quebec also purchase hydro-electric energy from outside sources and the installation given under Column 6 does not represent the full capacity required; these mills are marked (p) in the last column of the table, to show that energy is purchased.

Mills Operated from Purchased Energy

Table No. II gives a list of mills operated entirely from purchased hydro-electric energy. Mills purchasing power and appearing in Table I with the mark (p) have not been repeated in Table II. In this connection it may be mentioned that a few of the mills listed as purchasing power could practically be said to produce their own hydro-electric energy in cases where the power plant is almost exclusively used to supply the pulp and paper mill but is operated by a subsidiary or allied organization. On the other hand we find large power organizations supplying a considerable amount of power to the pulp and paper industry. In Quebec, the Shawinigan Water & Power Company and allied organizations supply some 80,000 h.p., while in Ontario, the Hydro-electric Power Commission and Toronto Power Company together supply some 55,000 h.p. for this purpose.

Characteristics of Geographic Groups

The location of the pulp and paper mills in Canada shows that they are grouped according to facilities for wood, power or transportation. The various mills of the same group show certain outstanding features with regard to power requirements as a result of the class of production which characterizes the group.

Table No. III has been prepared to illustrate predominating features in certain districts into which our Canadian mills may be arbitrarily grouped. Perhaps the greatest contrast exhibited in this table is between the class of mills found in the Niagara and Toronto, Eastern Ontario, Montreal and Quebec city groups, where a large number of mills (Column 2), whose average capacity is small (Column 6), produce much of the miscellaneous kinds of paper (Column 9), while the British Columbia and more northerly groups in Ontario and Quebec comprise mills of large capacity (Column 6), requiring much power to produce principally pulp and newsprint (Columns 7 and 8).

Motive Power by Provinces

The mode of producing power for the operation of pulp and paper mills is summarized in Table No. IV. While there is still a large amount of water power used to drive the mill equipment directly from turbines, a considerable portion is utilized by first converting it to hydro-electric energy for the more convenient electric motor drive. Column 7 of this table which is made up by adding Columns 4 and 6 gives the total hydro-electric energy, including that purchased from outside sources, and a comparison of these figures with those of Column 3, representing direct drive from water power, shows that the two modes of operation are fairly evenly divided in British Columbia and Quebec; that electric drive predominates in Ontario and New Brunswick, while direct water-power drive is used almost entirely in Nova Scotia.

General Conditions in Each Province

A rapid inspection of the data in the various tables shows the province of Quebec slightly ahead of Ontario in the pulp and paper industry. British Columbia ranks next, followed by New Brunswick and Nova Scotia, while this industry has yet to be introduced in our prairie provinces.

QUEBEC

This province has 54 mills requiring a total of 312,867 h.p. either installed or purchased. The total daily producing capacity of these mills is some 3,000 tons of mechanical pulp, 1,500 tons of chemical pulp, 1,300 tons of newsprint, and 700 tons of other kinds of paper. There are naturally sveral large mills in this province where much energy is purchased or extensive water-power installations are required; the three largest are at Grand 'mere, where all the hydro-electric energy is purchased; Kenogami where power is obtained from two hydro-electric plants in addition to that produced at the mill; Shawinigan, where a portion of the power is purchased; each of these mills require some 25,000 h.p. or more. Other large mills requiring between 10,000 and 25,000 h.p. include those at Hull, East Angus, Brompton, Chicoutimi, Clark City and Cap Magdelaine.

ONTARIO

Ontario has 41 mills where the installed or purchased power aggregates 242,746 h.p. These mills have a total daily producing capacity of some 2,000 tons of mechanical pulp, 1,100 tons of chemical pulp, 1,800 tons of newsprint, and 600 tons of other kinds of paper. The feature in this province is the Iroquois Falls mill requiring 52,000 h.p. including the energy transmitted from Twin Falls; another large mill is located at Ottawa with an installation of 28,789 h.p. Mills requiring between 10,000 and 20,000 h.p. are numerous and include those at Sault Ste. Marie, Espanola, Sturgeon Falls, Thorold, Fort Frances and Fort William.

BRITISH COLUMBIA

British Columbia has 5 mills operated by water power but they are all of fair size and require a total installation of 48,800 h.p. while their daily producing capacity is 390 tons of mechanical and 345 tons of chemical pulp, 445 tons of newsprint and 30 tons of other kinds of paper. The two large mills at Powell River and Ocean Falls have respective installations of 24,000 h.p. and 20,550 h.p.

NEW BRUNSWICK

This province only has 3 mills operated by water power with a total installation of 14,668 h.p. and a daily producing capacity of 30 tons of mechanical and 250 tons of chemical pulp.

NOVA SCOTIA

There are 10 mills operated by water power in this province but most of them are not large; their total installation aggregates 17,999 h.p. and their daily producing capacity is some 230 tons of mechanical pulp.

Future Power Requirements of Industry

A few words may be added regarding the future trend of the pulp and paper industry which should be of particular interest from a water-power point of view. Owing to the present financial depression no very great expansion need be immediately expected. A very realistic illustration of what should be expected when industrial conditions become normal was afforded by the pulp and paper boom of 1918 and 1919. A large number of projected undertakings were then investigated and many requests for information were received by Dominion Government organizations in possession of the desired data as in most cases the parties concerned did not care in what province the mills were to be established. It was a case of obtaining pulp wood and water power almost at any cost and anywhere within reason. While most of these projects did not materialize owing to subsequent financial and other conditions they revealed what conditions may be expected in the future development of the industry and demonstrated what an important part our northern water powers will be called upon to assume in this connection.

Table No. 1

Pulp and Pulp and Paper Mills in Canada Operated by Water Power.

BRITISH COLUMBIA

	PLANT or MILL					
				Turbine Installation		
Owner or Company	River	Location	Head in Feet	No. of Units	Total H.P.	Foot Notes
1	2	3	4	5	6	7
Pacific Mills	Link	Ocean Falls	140	12	20,550	e
	Swanson cr.	1 mi. from Swanson Bay	130	4	1,750	e
Whalen Pulp & Paper Mills	Mill cr. and	Woodfibre	580	3	1,250	e
	Cedar cr.		1,100		950	
	Victoria lake	Port Alice	400	1	300	e
Powell R. Co., Ltd.	Powell	Powell	147	7	24,000	e
		Total	....		48,800	

ONTARIO

Owner or Company	River	Location	Head in Feet	No. of Units	Total H.P.	Foot Notes
Fort Frances Pulp & Paper Co.	Rainy	Fort Frances	28	9	18,000	e, b
Dryden Pulp & Paper Co.	Wabigoon	Dryden	45	2	1,800	e
The Spruce Falls Co.	Kapuskasing	Kapuskasing				a
Mattagami Pulp & Paper Co.	Mattagami	Smooth Rock Falls	36	3	9,350	e
Abitibi Power & Paper Co.	Abitibi	Iroquois Falls	41.5	14	28,000	e
	Abitibi	Twin Falls	60	4	24,000	e
Spanish River Pulp & Paper Mills	St. Marys	Sault Ste. Marie	18	12	14,400	
Spanish River Pulp & Paper Mills	Spanish	Espanola	63	8	15,820	e
Spanish River Pulp & Paper Mills	Sturgeon	Sturgeon Falls	36	11	13,390	e
Spanish River Pulp & Paper Mills	Sturgeon	10 mi. north of Sturgeon Falls	35	2	5,200	e
Provincial Paper Mills	Credit R.	Georgetown	12	1	65	p
Provincial Paper Mills	Credit R.	Georgetown	21	2	150	e, p
John Fisher & Son	Morden's cr.	Dundas	42	2	312	
Garden City Paper Mills	Old Welland Canal	St. Catharines	12	2	285	
Kinleith Paper Mills	Old Welland Canal	St. Catharines	21	2	605	p
Lincoln Paper Mills	Old Welland Canal	Merritton	18	4	639	
Lincoln Paper Mills	Old Welland Canal	Merritton	25	3	1,450	e
Riordon Co.	Old Welland Canal	Merritton	14	3	650	e, p
Provincial Paper Mills	Old Welland Canal	Thorold	14	2	1,040	e
Provincial Paper Mills	Old Welland Canal	Thorold	12	3	453	e
Beaver Wood Fibre Co.	Welland Canal	Thorold	22	2	680	p
Thorold Pulp Co.	Old Welland Canal	Thorold	12	5	614	
Canadian Paperboards Co.	Trent	Frankford	13	5	1,080	e, p
Miller Bros. Co.	Trent	4 mi. from Trenton	11	4	684	e
Belleville Paper Mills	Moira	Belleville	14	2	90	p
Strathcona Paper Co.	Napanee	Strathcona	8	2	153	p
Specialty Paper Mills	Napanee	Camden East	18	1	125	
The Bronson Co.	Ottawa	Ottawa	29	1	2,000	
J. R. Booth	Ottawa	Ottawa	30	13	28,789	e
Howard Smith Paper Mills	Cornwall canal	Cornwall	8	13	800	e, p
		Total	....		170,624	

QUEBEC

Owner or Company	River	Location	Head in Feet	No. of Units	Total H.P.	Foot Notes
Riordon Co.	Gordon cr.	Timiskaming	214	2	7,200	e
E. B. Eddy Co.	Ottawa	Hull	34	7	14,149	e
Jas. MacLaren Co.	Lievre	Buckingham	45	8	8,125	
J. C. Wilson	North	Lachute	18	9	1,200	
Rolland Paper Co.	North	St. Jerome	25	4	800	e
J. C. Wilson	North	St. Jerome	33		954	
Rolland Paper Co.	North	Ste. Adele	100	5	1,325	
Howard Smith Paper Mills	North	Beauharnois			300	p
Canadian Paperboard Co.	Lachine Canal	Montreal	9	2	180	e, p
J. R. Walker & Co.	Ottawa	Sault au Recollet	7		850	
Howard Smith Paper Mills	Lac Ouareau	Crabtree Mills	29	1	1,200	e
Alex. McArthur & Co.	L'Assomption	Joliette	12	3	275	p
Belgian Industrial Co.	St. Maurice	Shawinigan F.	140	20	17,910	p
Brown Corporation	St. Maurice	La Tuque	85	2	3,200	e
Dominion Paper Co.	Nicolet	Kingsey Falls	24	3	880	e
Lotbiniere Lumber Co.	Nicolet	Danville	57	5	1,680	e, p
Brompton Pulp & Paper Co.	St. Francois	East Angus	55	13	10,701	p
Brompton Pulp & Paper Co.	St. Francois	Bromptonville	30	9	10,316	e
Canada Paper Co.	St. Francois	Windsor Mills	15	15	5,025	p
Lake Megantic Pulp Co.	Chaudiere	Lake Megantic	20	5	1,550	
Rowland Ford & Son	Portneuf	Portneuf	22	3	450	e
Ru-Ber-Oid Felt Mfg. Co.	Portneuf	Portneuf			750	
Montreal Paper Ltd.	Portneuf	Portneuf Stn.	18		250	p
Joseph Ford & Co.	Portneuf	Portneuf Stn. (No. 1 Mill)	8			
Joseph Ford & Co.	Portneuf	Portneuf Stn. No. 2 Mill	15		250	p
Eastern Paper Co.	Portneuf	St. Basile	13	2	130	
Joseph Piche	Portneuf	St. Basile	8	1	75	
News Pulp & Paper Co.	Ste. Anne	St. Raymond	31	10	4,080	e
Donnacona Paper Co.	Jacques Cartier	Pont Rouge	65	1	1,000	
Bird & Son, Ltd.	Jacques Cartier	Pont Rouge	17	7	1,384	e

Table No. 1 (Continued)

Donnacona Paper Co.	Jacques Cartier	Donnacona	60	5	6,000	e, p
Henry Atkinson	Etchemin	St. Romuald	26	4	946	e
Henry Atkinson	Etchemin	St. Romuald	10	4	167	
Richard & Co.	Petit Pre	L'Ange Gardien	600		500	
La Cie de Pulpe de Chicoutimi	Ouiatchouan	Val Lalbert	254	4	7,300	
Quebec & Saguenay Pulp Co.	Little Peribonka	St. Amedee de Peribonka	22	5	1,500	e
Jonquiere Pulp Co.	Au Sable	Jonquiere	65	33	4,500	
Price Bros. & Co.	Au Sable	Kenogami	265	8	26,200	e
Price Bros. & Co.	Shipshaw	Ste. Anne de Chicoutimi	90	3	10,600	c, c
Price Bros. & Co.	Shipshaw	Chute aux Galets	101	2	17,600	c, e
La Cie de Pulpe de Chicoutimi	Chicoutimi	Chicoutimi	105	6	10,850	p
La Cie de Pulpe de Chicoutimi	Chicoutimi	Chicoutimi	85	6	9,350	p
Donahue Bros., Reg'd.	Murray Bay	Murray Bay	58	5	9,000	e
Wolf River Pulp & Paper Co.	Riviere du Loup	Riviere du Loup	75	3	3,160	
F. Flo Soucy	Riviere du Loup	Old Lake Road	40	2	800	
Price-Porritt Pulp & Paper Co.	Rimouski	Rimouski	52	2	3,150	e
Gulf Pulp & Paper Co.	Marguerite	Clark City	54	7	11,000	e
Great Eastern Paper Co.	Madeleine	Madeleine	102	2	5,600	e
			22			
		Total	....		224,412	

NEW BRUNSWICK

Fraser Companies, Ltd.	Madawaska	Edmundston	24	2	3,000	e
Bathurst Co., Ltd.	Nipisiquit	Grand Falls	110	2	9,000	e
St. George Pulp & Paper Co.	Magaguadavic	St. George	46	4	2,668	e
		Total	....		14,668	

NOVA SCOTIA

Sissiboo Pulp & Paper Co.	Sissiboo	Weymouth Falls	60	4	3,120	e
Clyde Pulp Co.	Clyde	Port Clyde	20	4	1,800	e
MacLeod Pulp & Paper Co.	Mersey	Rapid Falls	33	14	6,024	
MacLeod Pulp & Paper Co.	Mersey	Cowie Falls	22			
Panstock Corporation	Medway	Harmony Mills	38	2	2 250	e
Nova Scotia Wood Pulp & Paper Co.	Medway	Mill Village	18	3	1,625	
La Have Pulp Co., Ltd.	La Have	New Germany	30	6	1,500	
Gaspereau River Light, Heat & Power Co.	Gaspereau	Whiterock	30	1	580	
St. Croix Paper Co.	St. Croix	Hartville	28	3	100	
Panuke Pulp & Paper Co.	St. Croix	Hartville	27	3	1,000	
		Total	....		17,999	
		Canada	....		476,503	

(a) Under construction.
(b) Portion of power is exported to U.S.
(e) All or portion of power converted to hydro-electric energy.
(p) Hydro-electric energy is also purchased from an outside source.

Table No. 2

Pulp and Paper Mills in Canada Operating Entirely from Purchased Hydro-electric Power

ONTARIO

Company	Head Office	Location of Plant	Power Purchased From
Fort William Paper Co.	Fort William, Ont.	Fort William, Ont.	Kaministiquia Power Co.
Provincial Paper Mills	56 University Ave., Toronto, Ont.	Port Arthur	Hydro-Electric Power Comm.
Nipigon Fibre & Paper Mills	Nipigon, Ont.	Nipigon	Hydro-Electric Power Comm.
Timiskaming Pulp & Paper Co.	Haileybury, Ont.	Haileybury	Northern Ontario Light & Power Co.
Fibre Board	Penetanguishene	Penetanguishene	Hydro-Electric Power Comm.
Interlake Tissue Mills	Merritton	Merritton	Hydro-Electric Power Comm.
Ontario Paper Co.	Thorold	Thorold	Toronto Power Company and Hydro-Electric Power Comm.
Hinde & Dauch Paper Co.	43 Hanna Ave., Toronto	Toronto	Hydro-Electric Power Comm.
Don Valley Paper Co.	714 Dominion Bank Bldg., Toronto	Don Valley, Tonont o	Toronto Power Co.
Canadian Nashua Paper Co.	Peterborough, Ont.	Peterborough	Hydro-Electric Power Comm.
Canadian Paperboard Co.	2 Seigneur St., Montreal, P. Q.	Campbellford	Town of Campbellford
Hydro-Electric Power Com.	Toronto, Ont.	Campbellford	Hydro-Electric Power Comm.
Provincial Paper Mills	56 University Ave., Toronto, Ont.	Mille Roches	St. Lawrence Power Co.
Cornwall Pulp & Paper Co.	Cornwall, Ont.	Cornwall	Hydro-Electric Power Comm. & St. Lawrence Power Co. Ltd.
Riordon Company, Ltd.	355 Beaver Hall Sq., Montreal, P. Q.	Hawkesbury	Hawkesbury Electric Light & Power Company.

Table No. 2 (Continued)

QUEBEC

The Beaver Company	Buffalo, N. Y.	Aylmer Road	Hull Electric Co. Ltd.
Valleyfield Coated Paper Mills	Valleyfield	Valleyfield	Valleyfield Electric Co.
Bennett Limited	Chambly Canton	Chambly Canton	Montreal Light, Heat & Power Consolidated
International Paper Co.	30 Broad St., New York City	Three Rivers	Shawinigan Water & Power Co.
Wayagamack Pulp & Paper Co.	Three Rivers	Three Rivers	Shawinigan Water & Power Co.
St. Maurice Paper Co., Ltd.	Board of Trade Bldg., Montreal, P. Q.	Cap Magdelaine	Shawinigan Water & Power Co.
Laurentide Company, Ltd.	Grand'mere	Grand'mere	Laurentide Power Co. Ltd.
The Ha! Ha! Bay Sulphite Co.	Port Alfred	Port Alfred	La Soc.d'Eclairage et d'Energie Electrique du Saguenay

Table No. 3

Hydraulic Power in Pulp and Paper Mills—Characteristics of Various Groups

Groups	Number of Mills in Group	Horsepower				Avg. Daily Producing Capacity per Mill in Group—Tons		
							Paper	
		Own Turbine Installation	Purchased Hydro-Electric	Total for Group	Total per mill in Group	Pulp	News	Others
1	2	3	4	5	6	7	8	
British Columbia.	5	48,800		48,800	9,760	147	89	6
North & Western Ontario.	7	81 150	16,350	97,500	13,930	173	93	4
North Lake Huron.	3	48 810		48,810	16,270	268	223	
Niagara & Toronto District.	17	6.943	42,142	49,085	2,890	33	18	18
Eastern Ontario.	14	33,721	13,630	47,351	3,380	42	12	17
Montreal District & Western Quebec.	15	36,558	3 345	39,903	2,660	28	5	17
Eastern Townships.	6	30 152	8,500	38,652	6,440	90	18	24
St. Maurice Valley & Three Rivers District.	6	21,110	66,350	87,460	14,570	268	111	27
Quebec City District.	14	15,982	3 760	19,742	1,410	15	10	7
Lake St. John & Saguenay District.	7	87,900	6,500	94 400	13,490	176	44	5
Lower St. Lawrence & Gulf.	6	32,710		32,710	5.450	72		
New Brunswick.	3	14,668		14,668	4,890	93		
Nova Scotia.	10	17,999		17,999	1,800	23		

Note: The large capacity of mills predominating in certain districts is emphasized by the figures under Column 6, while the class of production characterising each group can be judged by the figures under Columns 7, 8 and 9.

Table No. 4

Character of Hydraulic Motive Power in Pulp and Paper Mills in Each Province

Province	No. Mills	Installed and Purchased Power - H.P.					
		Turbine Installation					
		Direct Drive.	Hydro-Electric Drive	Total	Purchased Hydro-Electric Power	Total Hydro-Electric Cols. 4 - 6	Total From all Sources Cols. 5-6.
1	2	3	4	5	6	7	8
British Columbia	5	27,975	20,825	48,800		20,825	48,800
Ontario	41	89 430	81,194	170,624	72 122	153,316	242,746
Quebec	54	159,900	64,512	224,412	88,455	152,967	312,867
New Brunswick	3	2,368	12,300	14,668		12,300	14,668
Nova Scotia	10	17,919	80	17,999		80	17,999
CANADA	113	297 592	178,911	476,503	160 577	339,488	637,080

Column 3 represents the installation which is used to drive the mill machinery, such as grinders, etc., directly from water power.

Column 4 represents the installation also operated by pulp and paper organizations but where the power is first converted into hydro-electric energy and electric drive is used to operate all or a portion of the mill.

Column 5 is made up by adding columns 3 and 4 and represents the total water-power installation operated by the pulp and paper organizations themselves.

Column 6 represents the amount of electric energy derived from water power and purchased from central electric stations for use in the pulp and paper industry.

Column 7 is made up by adding columns 4 and 6 and is an indication of the use of electrical energy derived from water power in the pulp and paper industry.

Column 8 gives the totals of columns 5 and 6 and indicates the total installation and purchased power for the industry derived directly or indirectly from water power.

New Executive of C. E. A. Already Actively at Work

The first meeting of the new Administrative Executive Committee of the Canadian Electrical Association (Incorporated) for the Association's year 1922-23 was held on June the 29th. in Montreal.

C. J. Johnston, comptroller of the Southern Canada Power Comp. was elected treasurer of the association, and Louis Kon, secretary-manager of the Electrical Co-operative Association, Province of Quebec, was appointed secretary.

The association feels that the work of the Commercial Section in the past was not developed to the extent of its possibilities and needs or as far as the opportunities warrant and conditions call for, therefore, it was decided to appoint a special general committee, under the guidance of the chairman of the Commercial Section, Mr. L. W. Pratt, of the Hamilton Cataract, Light and Traction Company, and consisting of the following members: W. O'Brien, Montreal Light Heat & Power Con.; Geo. B. Atchison, Southern Canada Power Comp.; J. H. O'Hara, Ottawa Electric Comp.; P. R. Labelle, Shawinigan Water & Power Comp.; Kenneth McIntyre, Can. Repr. Society for Elec. Dvlpt. and nominees of the Canadian General Electric, Northern Electric and Canadian Westinghouse Companies.

It is hoped that each member of the General Committee will take up some phase of the commercial activities of the electrical industry, giving particular study to his chosen subject and that it will result in bringing before the next year's convention a larger number of reports and more discussion of commercial problems than was the case heretofore. It is safe to state that with the general committee as formed and the sympathy of the president elect, Mr. P. T. Davies, towards a policy of constantly improving the technical section but to bring, at the same time, the commercial section on a par with the former, gratifying accomplishments for the general good of the electrical industry will result as the work progresses.

Standing Sections and Committees for the ensuing year were appointed as follows.

Commercial Section

Chairman,—L. W. Pratt, Hamilton Cataract Light & Traction Co., Hamilton, Ont.; Power Sales Bureau,—W. O'-Brien, Montreal Light, Heat & Power Con. Montreal, Que.; Merchandise Sales Bureau,—Geo. L. Atchison, Southern Canada Power Co., Montreal, Que.; Light Sales Bureau,—J. H. O'Hara, Ottawa Electric Co., Ottawa, Ont.; Representative on Committee on Commercial Service Relations with Customers,—Chas. T. Barnes, Toronto and Niagara Power Co., Toronto, Ont.

Accounting Section

Chairman: Paxton Little, Canadian Niagara Power Co., Toronto; C. J. Johnston, Southern Canada Power Co., Montreal; H. R. Lyons, Montreal Light, Heat & Power Con. Montreal; J. J. O'Brien, Quebec Rly. L. H. & P. Co., Quebec City, P. Q.; F. A. Jansen, Ottawa Electric Co., Ottawa. Ont.; J. Bailey, Shawinigan Water & Power Co., Montreal, and a nominee of the Bell Telephone Co.

Technical Section

Chairman: R. J. Beaumont, Shawinigan Water and Power Co., Montreal.

Underground System Committee:—Chairman, L. A. Kenyon, Montreal L. H. & Pr. Con. Montreal; R. B. McDunnough, Publ. Serv. Corp. of Quebec, Quebec; Geo. Kirlin, Standard Underground Cable, Montreal; H. D. Johnston, Eug. Philips El. Wks., Montreal; W. S. Vipond, Northern Electric Co., Montreal.

Inductive Interference Committee:—Chairman, J. Mores, Shawinigan Water & Power Co., Montreal; Mr. Lawson, Can. Niagara Power Co., Toronto, Ont.; E. C. Read, Montreal L. H. & Pr. Con. Montreal; Nominees, Can. General Elec & Canadian Westinghouse.

Lamp Committee:— Chairman, W. Kintner, Canadian Westinghouse Co., Montreal; J. T. Scott, Canadian General Electric Co., Toronto; Appointee of Laco Lamp Company.

Overhead System Committee:— Chairman, A. A. Dion, Ottawa Electric Co., Ottawa; O. V. Anderson, Toronto, & Niagara Power Co., Toronto; G. M. Anderson, North Shore Power Co., Three Rivers, Que.; E. A. Stanger, Southern Canada Power Co., Montreal; A. B. Cooper, Ferranti Meter & Transformer Co., Toronto; R. J. Everest, Electric Service Corp., Shawinigan Falls, Que.; Representative of the Bell Telephone Co.

Hydraulic Committee:— Chairman, S. Svenningson, Shawinigan Water & Power Co., Montreal; J. S. H. Wurtele, Southern Canada Power Co., Montreal; R. M. Wilson, Montreal Light, Heat & Power Con. Montreal; Appointee Dominion Engineering Company, Montreal.

Meter Committee:— Chairman E. Holder, Shawinigan Water & Power Co., Montreal; Scott Lynn, Sangamo Electric Co., Toronto;E. G. Ratz, Can. Westinghouse Co., Hamilton; E. J. Turley, Montreal Light, Heat & Power Con. Montreal; E. R. Spende, Southern Canada Power Co., Montreal; S. L. B. Lines, Lincoln Meter Co., Toronto; Nominees of Nova Scotia Tram. & Power Co.; Canadian General Electric, Ferranti Meter and Transformer and Packard Electric Cos.

Rural Lines National Committee:— Chairman, R. J. Beaumont, Shawinigan Water & Power Co., Montreal; A. A. Dion, Ottawa Electric Co., Ottawa; P. T. Davies, Southern Canada Power Co., Montreal; G. M. Anderson, North Shore Power Co., Montreal; Nominee of the Bell Telephone Company.

Accident Prevention National Committee:— Chairman, Willis Maclachlan, Toronto, Ont.; A. P. Doddridge, Que. Rly, Lt. H. & Pr., Quebec, P.Q.; J. T. Lambert, Ottawa Electric Co., Ottawa; J. H. Martin, Bell Telephone Co., Toronto; E. Puxton, Canadian Westinghouse, Hamilton; J. W. Dunfield, Southern Canada Power, Sherbrooke, Que.; L. B. Temple, Montreal Light, Heat & Power Con. Montreal; J. C. Smart, Shawinigan Water & Power Co., Joliette.

Public Relations Section

Chairman: J. B. Woodyatt, Southern Canada Power Co., Montreal.

On behalf of the Public Relations Section, its chairman Mr. J. B. Woodyatt expressed his opinion that it is almost impossible and not desirable to centralize that committee's work, the reasons for it being the very great distance between the various points of organized activities in the electrical industry of the Dominion, the differences of political opinions in the various Provinces and greatly varying conditions in the various sections of the country.

Therefore it was decided to assist wherever practicable the formation of Co-operative Associations and Leagues which would be purely local in their scope of work, and to help in exchange of ideas and results of theoretical as well as practical work undertaken on the Co-operative basis by the various local electrical Associations, Leagues and Clubs.

On the whole the programme for the ensuing year shows a strong desire to enlarge the scope of the association's work towards practical results which would give better service to the public in every respect at the same time increasing financial returns to the electrical industry through better salesmanship and greater realization by consumers of the economic and social value of electrical energy and electrically driven labor saving devices.

Lamp Temperatures in Modern Lighting Practice

By J. T. SCOTT*

The question of operating temperatures of incandescent lamps has so often arisen that a short survey of the subject will perhaps settle some doubts and prove generally instructive.

The main facts presented here are based upon a series of experiments carried on over a period of years by C. L. Dows and W. C. Brown at the Nela Park Labatories of the General Electric Company.

Extensive research has been undertaken to determine the extent of the hazard resulting from the use of incandescent lamps in atmospheres such as are found in flour mills, grain elevators, etc., where there is liability of dust explosions.

Fires or explosions which may be caused by incandescent lamps in dust-laden atmospheres are of two kinds: (1) Fires resulting directly from ignition of dust accumulating on the lamp bulb: (2) Explosions resulting from the accidental breakage of lamps in a dusty atmosphere containing the proper proportions of air and dust to form an explosive mixture. Such an atmosphere is frequently found where such materials as starch, oatmeal, grain, flour or sugar are handled.

(1) Fires From Ignition of Collected Dust

There is a considerable margin between the smoking and ignition temperatures of the various dusts. There are numerous conditions which determine whether or not this margin is safe, such as the character and the ignition temperature of the lamp bulb on which the dust accumulates. The two tables following indicate that there is a safe margin between lamp operating temperatures and the ignition point of various dusts.

Table 1. Operating Temperatures of Tungsten Lamps

Size of Lamp	Temperature of bulb (maximum) Deg. F.	Temperature of bulb at junction of brass and glass Deg. F.
50 watt Vacuum	135	113
75 watt Gas-filled	240	181
100 watt Gas-filled	262	183
150 watt Gas-filled	338	150
200 watt Gas-filled	330	171

Table 2. Margin of Temperatures of Various Dusts

Name of Dust	Smoking Temperature Deg. F.	Ignition Temperature Deg. F.	Difference between Smoking & Ignition Temperature Deg. F.
Sample No. 1	288	511	223
Sample No. 2	298	536	238
Sample No. 3	295	532	237
Cocoa	313	558	245
Cornstarch	284	891	607
White Wheat Flour	315	919	604
Cornmeal	311	934	623

Sample No. 1—20% Oats Dust, 40% Winter Wheat, 10% Hard Winter Wheat, 30% Miscellaneous Dusts.

Sample No. 2—60% Oats, 35% Winter Wheat, 5% Rye.

Sample No. 3—40% Winter Wheat, 35% Barley, 25% Oats.

The smoking temperatures are about the same as the operating temperatures of the smaller, or lower wattage gas-filled lamps, but are 100 to 150 degrees higher than the bulb temperatures of vacuum lamps of corresponding wattages. From this it can be seen why dust smokes readily on gas-filled lamps and not on vacuum lamps.

It will be noted that the temperatures at which most dusts will ignite, are more than 300 Fahrenheit degrees above bulb temperatures of the 75 watt and 100 watt gas-filled lamps. Experiments conducted in a compartment where a permanent dust cloud was maintained, showed all attempts to start a fire with the 75 watt and 100 watt gas-filled lamps, or with vacuum lamps up to and including 100 watt sizes, as unsuccessful.

The temperatures at which some of the other dusts will ignite are more than 700 degrees F. above the bulb temperatures of vacuum lamps, and more than 600 degrees F. in the case of the 75 watt and 100 watt gas-filled lamps.

If any inflammable dust is permitted to collect thickly enough and remain long enough upon a bulb, a fire is almost sure to follow. For this reason it is difficult to set any definite workable limits between bulb temperature and ignition temperature, which may be considered safe in all cases. Vacuum lamps may generally be considered safe. The 75 watt gas-filled lamp would hardly be expected to cause a fire when suspended in a freely circulating atmosphere. With the larger wattages and drier dusts, the margin of safety might be so reduced that there would be a possibility of fire.

There is far less hazard in the general lighting system than in the practice of using lamps on drop cords. At times, lamps are allowed to become actually buried in bins of grain and the like, and the fire risk is of course greatly increased.

(2) Fires From Lamp Breakages

The possibility of fire from accidental breakage of lamps is of much greater importance than that resulting from the collection of dust on an incandescent lamp bulb.

It is only on rare occasions that lamps are broken otherwise than by accident or careless usage. The use of an unprotected lamp at the end of a portable cord in a dusty atmosphere is careless in the extreme.

Whenever there is the possibility of an explosive dust cloud being present, incandescent lamps should be provided with protection against breakage. Vapor-proof units give some degree of protection. A wire guard for the globe of the vapor-proof fixture will greatly increase its resistance to breakage. The essential point in this connection is that the filament of the lamp should be so protected that there is no possibility of its becoming exposed to the dust-laden atmosphere.

The incandescent lamp is by far the safest illuminant in existence for use in these locations, but its application has been given too little attention up to the present time. Properly installed and properly used, it will be found to fill all requirements.

This holds good also for the use of incandescent lamps in such places where pulverized coal, gasoline, oils etc., are handled and where explosive gases or vapors may be present in the air.

Soon after the gas-filled lamp was introduced in the early part of the year 1914, criticisms began to be heard because of the greater amount of local heat developed. The bulb which felt hot to the touch, the extreme brightness of the filament, and the larger power consumption combined to make the fire hazard appear greater than it really was.

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*Sunbeam Lamp Division, C.G.E. Co., Ltd.

In some districts, local inspectors formulated rulings which were so strict that installation of gas-filled lamps was greatly hindered.

Almost invariably, rules relating to the installation, of gas-filled lamps contained a reference to ventilation, which was expected to lower the temperature of the unit.

There is no doubt that ventilation, however slight, usually cools the lamp bulb and some other parts of the unit to a certain extent, but this is ordinarily accompanied by a corresponding rise in the temperature of other parts. A considerable number of tests indicate that ordinary ventilation does not always cool the wire and socket parts, but actually raises their temperature in many instances.

There will be appreciated the big advantages of keeping a unit tight so as to reduce dirt accumulation, improve the light efficiency etc., and there are many well designed types of enclosing units with temperature actually less at the socket and wire entrance due to non-ventilation.

It should be recognized that radiation is just as effective in dissipating heat as ventilation—in fact, the 'chimney effect' of ventilation often increases the temperature of the very parts that it is desired to keep cool.

The growing tendency on the part of fixture manufacturers toward non-ventilation units is evidenced by the number of such units as have been placed on the market within the past year. By taking care of heating through radiation rather than ventilation, marked progress has been made, not only toward better control of temperatures, but in the direction of slower dirt accumulation, greater ease of cleaning, better appearance, and greater accessibility in handling the unit.

The incandescent lamp is the most reliable of all modern illuminants, and it is hoped that the information given here will suffice to dispel any doubts that may be felt with regard to conditions of safety and the operating temperatures of such lamps.

"House to House Appliance" Selling

By O. R. HOGUE[*]
Commonwealth Edison Company

Door-to-door canvassing does not mean the front door; it means the back door, where we find the lady of the house who does her own work and who above all others appreciates labor-saving devices of all kinds.

We have found from experience that there is an enormous turnover in salesmen doing this class of work, and in order to maintain a force of one hundred men who can properly sell electric appliances, it is necessary to give them at least an initial knowledge of the appliances they are to sell, to instruct them in the policy of the central-station company and to get them started on salient selling talks. We have, connected with the Commonwealth Edison Company, the Central Station Institute, where they are taught the merits and value of the appliance, and how to give this information to the prospective customer. They also receive briefly the mechanical and electrical knowledge that is just as necessary a component in their general knowledge as how to convince the "prospect" that the appliance is something that will be of value to her in her every-day life. After this instruction the men are turned over to the campaign captains, with a concrete foundation on which to start.

Our policy is to sell from door to door. We use electric trucks capable of holding a fair quantity of appliances of various kinds, which is supervised by a captain who has under him a crew of from ten to fifteen or sixteen salesmen, never more than that number. These wagons are loaded at one of our warehouses each morning at about 8 o'clock, under the direct supervision of the wagon captain, as he is called, and goes immediately to a designated location where the crew has been instructed to meet the captain. The city is divided into districts, with definite boundary lines, beyond which any one wagon is not permitted to sell. The captain allots districts within this district to each man, and the work of the day is begun at 8:30 at the latest. Each member of the crew has a sample of the appliance, whatever it may be —an iron, a toaster, a lamp, etc.—and he proceeds to the district allotted to him. If he sells his goods, he leaves the article and returns to the wagon for another.

There are only certain lines of goods that can be sold satisfactorily in this way—the smaller articles, easily handled and which sell for sums within reach of the moderately situated citizen. We originally figured that this back-door campaigning was only a summer proposition, but for the past year we have maintained our campaign force during the entire year with exceedingly satisfactory results. We shift from irons to heaters, to portable lamps and to a combination iron and ironing board at a special price, of which we have recently sold about eight thousand. These, together with percolators and toasters, warming pads and many other similar articles, seem to be in demand.

The selling of portable lamps is an especially new idea with us and we expect to continue this line indefinitely. We are also developing a line of smaller articles such as fuse plugs and twin sockets which the men can carry in their pockets.

Compensation of Salesmen

Many schemes have been tried to compensate the salesmen on an equitable basis, such as a guaranteed sum per week and a salary and commission basis; but we have found from long experience that the only satisfactory way is the commission basis, and the commission must be large enough to attract a good salesman. A dollar per iron we feel should be the minimum, and $1.50 for a portable lamp selling at various prices up to $15.00. The captain of the crew is paid a straight salary. If to this salary a bonus on sales made by his crew is added, he will work that much harder to increase his wagon's sales, not only increasing his own earning capacity, but incidentally the earning capacity of the men in his crew. A prize system for the wagons with the largest sales over and above a stipulated sum works wonders. An extra bonus for the men selling over a certain number on some particular article during any given week also adds zest to the selling.

In conclusion, I wish to emphasize that this class of merchandising can only be sold in large quantities by this door-to-door canvass, and it is a profitable business from the standpoint of merchandising. Moreover, it is a very essential line of business for the central station, as it is the very best means of increasing the customers' use of central-station service. The customer first becomes interested, perhaps, in the electric iron; then a percolator or a toaster is added to the list, and finally the greater labor-saving devices, such as the washing machine, mangle and vacum cleaners, are installed in the home. Each appliance adds something to the customer's bill for energy for the month; multiply this by the vast number of customers using these appliances, and the income to the central station for additional energy is quite considerable.

W. F. Frizzell, for 20 years superintendent of the Glace Bay Power Plant, Glace Bay, N. S., died on June 29, following a stroke of paralysis. He had been unwell for some months. He was a native of Hills County, N. S., and 65 years of age.

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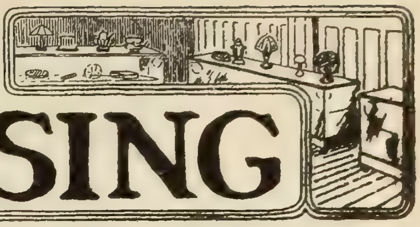
[*] Before Illinois Utility Association.

BETTER MERCHANDISING



"We Must All Face the Situation Squarely"

Victoria, B.C.

Editor Electrical News:—

Taking into consideration the general financial conditions prevailing I believe that serious thought should be given by all firms selling electrical appliances to the adoption of a more generous policy in respect to the time payment sales plan, in order to stimulate business and to enable people of limited incomes to gradually acquire a complete outfit of the more useful and necessary electrical conveniences for the home.

Locally we have gone extensively into the time payment method of making sales and the results have been very gratifying, a particularly important item being, that by careful supervision by our credit department, bad debts covering this class of business during the past year have been practically nil.

There are hundreds of consumers in all cities who, owing to their small means, are unable to pay all cash when making purchases; it is to such as these that the easy payment scheme if properly presented, would appeal. Some dealers are adverse to the idea; however, the situation is that conditions are not what they were some years ago and sales policies must be altered to meet the new conditions; if approached from the right angle there is a splendid opportunity to create profitable additional business by making it easy for people to buy. With the exception of a few articles such as electric irons, the majority of the other appliances are only to be found in, on an average, from 5% to 20% of the homes in the United States and Canada. It is evident therefore, that there is plenty of scope for us all to do some real big business which will benefit not only the jobber, dealer and central station, but assist in keeping our factories going.

The writer was recently in California and noted the aggressive measures being taken by the large departmental stores in featuring electrical appliances; splendid large window displays were in evidence and easy time payments arranged for. The thought **was left with me that if we who are engaged exclusively in the electrical game are to hold and extend the appliance business, we must all face the situation squarely and adopt attractive measures to gain an increased volume of sales** and this, I feel sure, includes making it easier for the average family to purchase electrical goods.

S. J. Halls,
Manager Light & Power Department,
B.C. Electric Rly. Co., Ltd.

Vacuum Tube Renders Possible High Development of Wireless

Success Lies in Amplification of Electrial Impulses

Previous articles of this series have dealt with the construction of radio sets without the use of amplification. The sets discussed have been of an elementary type and though generally such arrangements are known to work well, range and clearness as obtained with them do not compare with the results achieved using vacuum tube arrangements.

The Edison Effect

Edison, Fleming and DeForest, among others, have done pioneer work resulting in the present apparatus. The first named discovered that if a cold plate is placed inside an electric light bulb, and if the plate is connected to a battery in such a way that it is slightly positive, an electric current will flow from the heated filament to the cold plate. Fleming constructed a similar piece of apparatus known as the Fleming oscillation valve. The introduction of a third member into the vacuum was first done by DeForest: this third member is called the grid and is a zigzag wire placed between the filament and the plate. (See Figure.)

Working of the Vacuum Tube

The theory of the manner in which this arrangement works is somewhat complicated and it is proposed to explain it in as simple a manner as possible.

When the filament is heated electrons are drawn over to the plate, which is positive. Within limits, the more positive the plate is made, and the higher the filament temperature, the more electrons flow from the filament to the plate.

The action of the grid may be understood by considering the space in the tube as a resistance to the flow of the electrons. The grid may be considered as varying this flow. If it is charged positively it decreases the resistance and more current flows, and vice versa.

Positive Oscillations Produce only Slight Changes

The diagram which is reproduced here shows a simple connection. It has been explained previously that an oscillating current is induced in the antenna which flows up and down through the primary inductance. This results in a similar oscillating current being set up in the secondary coil; obviously it varies from negative values to positive values. Now we know that a negative charge on the grid results in a drop in the plate current. This causes a drop in the current flowing through the telephone receivers. The positive oscillation does not produce as large a change in the plate current. The situation then is, that the negative halves of the current oscillations produce drops in the plate current while the positive oscillations produce very slight changes.

The incoming radio signal consists of a series of oscillations, called a "wave train," and the action of the apparatus is such as to smooth out the series of oscillations to a single drop in the telephone circuit. The grid is affected by a series of oscillations but the capacity of the receiver and the impedance of the receivers converts them to a single drop.

Hard and Soft Tubes

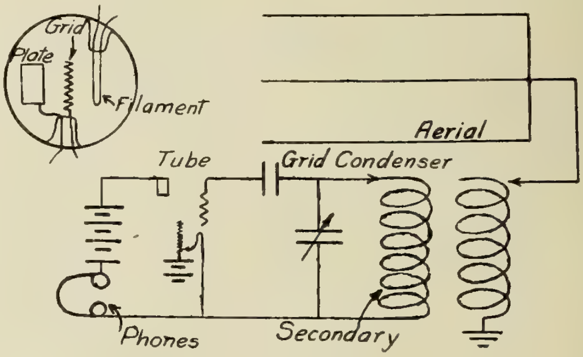
The vacuum tubes are made in two broad types, one called "soft" which has a low vacuum and consequently some gas in the tube, and the other "hard", having a nearly perfect vacuum. In general the gas-filled or soft tubes are more sensitive detectors but the hard tube is more easily adjusted, as it takes a definite plate voltage and a fixed value of filament current. When these values are reached the "hard" tube is ready for operating.

Vacuum Tubes also Amplifiers

The vacuum tube may also be used as an amplifier Small changes in the grid can be made to produce large changes in the plate current. One method is known as the impedance method. In this method an impedance is inserted in the circuit in place of the telephone receivers, being connected to the detector in their place. The incoming signals are detected by the first vacuum tube, where their first amplification is received. They are again amplified by being put in to the impedance. Although two or three steps may be obtained by this method, i.e. by using another amplifier, it is not considered practicable to obtain more.

There are several different methods of hooking up such a circuit. A straight ohmic resistance varying from ½ to 3 megohms, may be used in the circuit in place of the impedance. For the best results this resistance should equal the resistance which exists from the filament to the plate of the tube used.

Another method is that of using a small transformer in place of the resistance of impedances. This method is advantageous, in that the transformer can be used to step up the voltage causing greater amplification. Maximum amplification from a given tube without distortion is obtained when the input side equals the impedance of the filament to the plate path of the first tube, while the secondary has an impedance which is equal to the impedance from the filament to the grid of the amplifying tube; the transformer method permits of this.



The Armstrong Method

There have been other developments resulting in changes in various parts of the apparatus. Major Armstrong developed a circuit which required a single tube not only to detect, but also to amplify. His method was to take the amplified signals, which would ordinarily go to the telephone receivers and to feed these signals back to the input of the vacuum. They will then be amplified and reappear at the outlet. It is possible to return them to the input again and they will again reappear at the outlet considerably amplified.

In this method, instead of the telephone circuit running directly back to the input circuit, it runs through an extra coil, which is placed near the secondary inductance. The position of this coil is such that variations of current in it cause variations of current to be induced in the secondary. This results in these variations appearing in the telephone receivers, with a great degree of amplification.

When it is found that loud speakers are used and the signals are heard all over a room, it is generally in connection with the Armstrong method. Audio frequency amplifiers are used after amplification has been obtained by this method, resulting in greatly increased intensity.

The Uses of Radio in Business

The present popular demand for radio instruments is the result of the first general radio broadcasting which was carried out. It may be said to be due to the far-sightedness of one of the largest equipment manufacturers, who instituted the practice. Latterly, however, there has been a development in another direction, in the demand for instruments for practical business purposes; as the real future of the radio business depends upon this demand it is of interest to note what practical business uses have been found for this method of communication.

Radio Fosters Goodwill

The idea of fostering goodwill among patrons by sending them musical and other entertainment programs is the first use to which commercial broadcasting has been put. In September, 1921, the world's baseball series was sent out, play by play, from a department store. The returns were received in the store by telegraph, and farmers and others, in a wide radius outside, heard the news almost as quickly as the city fans. The wide publicity obtained and the popularity of this stunt induced the store manager to send out daily concerts.

Banks and other concerns which need the goodwill of the farmers have made a specialty of broadcasting crop reports, and financial information of a type likely to interest their clientele. Weather predictions and such like information is of vital importance to the farmer and it may be supposed that he feels rather kindly towards the concern that benefits him in this way.

Expense a Deterrent

There are several reasons, however, which prevent the universal use of broadcasting apparatus. One of the most potent is the high cost of such apparatus. Running expenses and the salary of an operator, make the costs high and many concerns are unwilling to bear the expense, particularly as it is difficult to estimate exactly the value of the publicity gained. At the same time, only a few stations in each district can be accommodated, working simultaneously. The operation of many stations in the same district results in nothing but confusion. In this regard it wuld appear to be first come, first served, however, it has been found by experiment, that the public will listen in up to midnight and there would seem to be still plenty of room in Canada.

Concerns who do not care to undergo the expense of a transmitting outfit have nevertheless found means to use the receiving apparatus in their business. One such firm has started a class to teach boys radio and is co-operating with high school science classes. Another store has found that the installation of receiving apparatus in departments where sales are being held gives much added publicity and brings good results. There may be some doubt as to the exact value of the publicity gained, but it is certain that an arrangement in which the horn of the apparatus projects through a window over the street draws the crowd, as has been found by a concern that tried such an arrangement. Some progressive restaurants have provided headpieces for each table. This is somewhat of a change from the usual loud speaker but it has been more satisfactory.

Direct Advertising Not Feasible

Experience so far seems to prove that the radio telephone cannot be used as a direct advertising medium. It would seem admirably adapted for such use, but people do not want to listen to spoken ads.; for another thing, picture what a mix-up there would be if every large concern tried to broadcast its advertising! No doubt the problem may be solved by future developments in the science, but for the present the recommendations that have been made to the effect that direct advertising by radio should be limited to a statement of the call letters of the station and of the name of the concern, would seem to be reasonable.

The setting of a precedent which will be difficult to live up to is always a rather risky business and those concerns who have been receiving broadcasting concerts for the benefit of their customers are finding it so. People get accustomed to good concerts and when there are none available, or when static interferes, the irritation of the expectant audience almost cancels the goodwill previously obtained.

Some people do not appreciate the loud-speaking apparatus in restaurants and tea-rooms. The manager of a place where such an outfit had been installed said that at first his customers were pleased with the innovation but later appeared disinclined to hear it every day.

These small difficulties are, however, but incidental. Radio has a place and has fitted marvellously into business where it was never before dreamt of. Power companies, steamship lines, forest rangers, timber operators and railway companies are now easily carrying on communication in cases where previously they would have been much handicapped. Those who are at all acquainted with the subject say that the day of radio is just beginning and that though it is early to prophesy, there can be no doubt but that its use will materially effect our present business methods.

Keeping Trains in Touch With Headquarters by Wireless

The Canadian National Telegraph System is carrying on some very interesting experiments on the utilization of radio, not only for the convenience of passengers on the Canadian National Railway System, but also with a view to expediting, and reducing the cost of operation. Experimental cars have been fitted out with receiving sets and results have been so satisfactory that it is planned in the near future to equip all the transcontinental trains with receiving equipment.

Railway companies, generally speaking, have an advantage in the fact that their lines are generally paralleled closely by telegraph lines, which have the effect of guiding the waves and increasing the range over which messages may be received. It is also the intention of the company to establish transmitting sets with a range of 75 to 100 miles, so that trains in transit may be constantly in touch with stations.

Though the whole matter is necessarily in the experimental stage, the results have been so satisfactory to date that the officials of the Canadian National Telegraph System are very optimistic regarding the advantages to be gained by the use of radio and are carrying forward their experiments as expeditiously as possible, with a view to establishing what will probably be the first transcontinental radio service in North America.

Mr. Alfred Potvin, foreman of the Public Service Commission, of Quebec City, died June 28. He collapsed suddenly and succumbed before medical assistance could be rendered. Deceased was known as an excellent electrician.

Manitoba Telephone System Considering Three Wireless Stations in the Far North

Investigations are being carried on at the present time for the purpose of erecting three wireless telephone stations in the northern parts of Manitoba, which would eventually link up with the wire system. One of these stations would be erected at The Pas, another probably at Norway House, and the third at Churchill, or another point to be decided on

The apparatus would be designed to deliver 500 watts of radio frequency power to the antenna system, under proper transmitting conditions these sets would have a range of several hundred miles. It is difficult to state definitely just when any of these stations will be in operation, but it is hoped to have The Pas station, at least, in operation this year.

Under present conditions communications north of the 53rd parallel are limited by the speed at which men or dogs can travel, in summer by canoe, in winter by sled. Always during spring and fall there is a season of six weeks during which the formation or breaking up, as the case may be, of the ice, renders any kind of travel impossible; thus under present conditions during nine months of the year, communication between civilization and the northern outposts is necessarily slow and arduous; during the remaining three months all communication is at a standstill. The installation of wireless outfit does away at one stroke with all the difficulties hitherto experienced in getting news to and from these districts.

New Broadcasting Station at Bridgeport, Pa.

The Diamond State Fibre Co., of Toronto, has informed the Electrical News that at the parent plant of the company, at Bridgeport, Pa., they are now operating two 250-watt radio trons, power tubes operated by a high voltage, 1,500 watt direct current generator, equipped with fan type antenna, 110 feet high, consisting of 5 wires with 80 feet spread at top.

Market reports are sent out daily from 11.45 to 12, daylight saving time, on wave length 485 metres. Concerts are sent out Thursday evenings, 7.30 to 8.30, on wave length, 360 miles. Call station is WBAG.

The Diamond State Fibre Co. would appreciate hearing from any amateur picking up this station. Address 235 Carlaw Ave., Toronto, Ont.

Will Get Market Reports

A new scheme for "wired wireless" is in contemplation by certain radio experts, by means of which millions of farmers now out of the regular broadcasting range will be enabled to "listen in" to market and agricultural reports with small crystal sets, which have a receiving range of 15 to 25 miles. This scheme takes into consideration the broadcasting of speech by means of the electrical power lines which cover the country with a network of wires. A sending station may be at one end of a wire which penetrates many miles into the "backwoods," and any farmer who is located within about thirty miles from this wire, anywhere along the route, can "listen in" with ease, on a low-priced crystal outfit.

The National Boiler & General Insurance Company, of Manchester, England, have issued an interesting little book entitled "Working of Dynamos & Motors," which is a series of notes on the care, working and maintenance of dynamos and electric motors. The booklet is well illustrated and contains a number of interesting ideas for the operating man.

Radio Notes

Some radio enthusiasts have had results by connecting to a metal bedspring, to electric doorbell wires, to wires run around the moulding near the ceiling of a room. In fact, almost anything may be used for an antenna, if the set is sufficiently sensitive and near enough to a powerful broadcasting station.

In order to keep a crystal detector in perfect adjustment first find the most sensitive spot by a buzzer test. When the point of the "cat's whisker" is well placed, drop some hot beeswax of paraffin around it. In practice, this has kept the whisker in the right place for months, and eliminates the necessity of seeking the elusive sensitive spot every time the set is to be used.

To China goes the honor of installing the longest commercial radio telephone circuit in the world. Radio telephone sets have been installed at Pekin and Tientsin, covering a gap of ninety miles. These have been connected with the regular telephone lines of the Chinese Government.

High Tension D. C. is Best

In discussion of the provision of power for wireless purposes, a prominent English engineer considers that high-tension direct current still holds the field, and that for large-power sets it should be possible to construct thoroughly sound direct-current generators to give 10,000 volts and, say, 20 to 30 amperes from one commutator. Such machines would be of the nature of special engine-driven generators or motor-generators, which arrangement would be satisfactory, as by variation of field strength the transmitters could be more readily and safely tuned up to full power. He further states, that six-phase or twelve-phase transmission could be successfully arranged, using three-phase 50-period current from public supply mains as prime mover. Twelve-phase or, rather, 12-half-wave continuous waves could be practically as pure as direct-current-generated continuous waves, but for equal harmonics it is thought that they cannot be so efficient.

Ottawa District of O. A. C. D. Formed

The contractor-dealers in the Ottawa district met on the evening of July 4, at dinner, in the Russell Hotel, and formed the Ottawa District of the Ontario Association of Electrical Contractors and Dealers with the following officers:

W. L. Donnelly, chairman; A. C. McDonald, secretary-treasurer; H. L. Allen, P. E. Marchand, P. M. Grimes, C. A. Moodie, executive committee. Mr. H. L. Allen was elected district representative to the provincial executive.

The meeting was addressed by V. K. Stalford, of Hamilton, who spoke on the form of organization adopted by the Ontario Association, the value of such organization and, incidentally, described the most interesting features in connection with the "Electric Home" recently put on by the Hamilton contractor-dealers.

Little by little the Ontario Association is building up on a solid foundation. Several districts have already been formed, with one representative from each comprising the executive of the provincial association. The Ottawa district comprises not only the city of Ottawa, but includes also the surrounding territory.

In regard to the rumors that are flying around as to the profits made in the manufacture of radio apparatus, the experience of one manufacturer may be enlightening. He found that of every hundred pounds of galena he tested for his sets, 93-1/2 pounds had to be rejected as useless.

Two Prices for the Same Article

By REY E. CHATFIELD*

Recently the Board of Directors of an Association of representative business men of one of the largest cities on the continent passed the following resolution,—

"RESOLVED that the practice of giving preferential prices by dealers to individuals either individually or in groups, is deprecated, as **the practice of selling the same article to one buyer more cheaply than to another is wrong,** both economically and ethically, and is likely to lead to a condition of merchandising that is unsound and dangerous to the community."

The association consisted of representatives of every branch of business in the city and was aimed to correct a growing practice of giving one price to one man, another to another and so on.

In Vancouver we are suffering from the same disease, particularly in the electrical industry. The wholesaler, contractor-dealer and contractor who makes a price on an article or a job and then "cuts" or "loads" that price for the benefit, or to the deteriment of the individual, as the case may be, is following a very dangerous practice, which in time would lead the industry back to the era of bartering, goods for goods, where the best trader always won in the contest of wits.

Time is lost and money wasted when the purchaser must shop around, haggle and beat down the price.

Suppose for example, that there was no price made on a roll of films for your kodak and you visited another city or another section of your own city. Assume you have been accustomed to paying 35 cents a roll for your films in your own section of the city and you find on enquiry that the dealer you first approach asks 60 cents for the same films. Naturally you shop around and find another dealer who will sell you films for 50 cents and eventually you find a man whose price closely approaches the price you are accustomed to pay. This condition is true in the electrical industry. Contractors who are figuring on a bid often waste half a day getting quotations for material worth probably $200. These quotations must be tabulated and compared. Much time is lost.

How much better it would be if there were more stability in the trade and every contractor could feel that the price from his dealer is as good as he could receive from any one else.

On the other hand the public is learning that by shopping around they are able to gain tenders for wiring jobs at widely varying figures. A prospective home builder calls for tenders on his electrical wiring and gets a variety of bids, and nine cases out of ten he takes the lowest bid, and in just as many cases this low bid is not a fair price, either to the dealer, to the consumer or indirectly to the wholesaler.

There is only one solution to this condition—**Know your costs**—mark up a job or an article of merchandise properly to cover the overhead plus a legitimate profit and then **stick to your price.**

The practice of changing prices to meet alleged competition has been followed until to day the consumer in nine cases out of ten is getting something for nothing and **he does not know it.**

Have faith in the fairness of your price and stick to it and you will find that your competitor is doing the same thing.

Data has been gathered on the use of electrical appliances among various members in the industry in Vancouver, with very interesting results.

175 queries were sent out and we received replies covering 105 persons in the industry with the results tabulated below:—

Appliances	No. Used.
Chafing Dishes	2
Electric Fans	6
Electric Irons	79
Grills	20
Hedlote Heaters	13
Immersion Heaters	5
Percolators	15

Appliances	No. Used.
Water Heaters	4
Ranges	8
Suction Cleaners	19
Toasters	50
Warming Pads	11
Washing Machines	9

Not a bad showing but the people in the trade seem to favor the table appliances. Have faith in your own merchandise. **Use the appliance you sell.**

How Do You Figure Contract Work?

By C. D. HENDERSON*

There is a growing tendency among electrical contractors to figure jobs on a retail price basis rather than by the old method of cost plus.

Many years of experience has proven that the latter method has many faults. First, most electric items are sold from a list, less discount, which means that one must go to considerable work arriving at the net laid down cost. Second, these figures are always of a confidential nature which you can not very well show your prospective customer and should you be fortunate enough to get the job, it is not always well for your wiring-man to know your exact cost.

If it should happen that you have enough confidence in your prospective customer to show him your cost sheet, the one item that stands out head and shoulders above everything else, in his eyes, is the percentage which you have added; and even tho' it might be as low as 25% (we hope not) it looks to him like a 25% net profit and you immediately leave yourself open for an argument with the result that he either beats you down in your price or you lose the job.

On the other hand, the new idea of figuring all work from a retail price list has numerous things in its favor. For instance—it is quicker and the danger of exposing confidential information is eliminated.

Let us take for a concrete example, a sample contract job. We will assume that you are asked to put in a price on rewiring a building. You first take off your list of materials; estimate the amount of labor required and then turn to your price list. Carry out the selling prices of the items and then if the job comes to a total of say—$570.20, you may if you think advisable, make a special discount of 10% by reason of the size of the job.

Now go to your prospect and show him all the different items required and the price of each, call his attention to the regular price of $570.20 and then show him that you are allowing him a special discount of 10% over and above what you would charge if the job were to cost $30.00 or $40.00

This is not simply a theoretical scheme which looks nice on paper. Some of the most successful firms have used it for the past three or four years and instead of losing business, it actually helps them procure work against the lower tenders offered by their competitors. Don't over-look the human element. Remember that most of us like to see items and furthermore where is the individual that is not pleased with a special discount.

Below is a list of a number of items picked at random, simply to illustrate the plan. Why not try it out? You will get just as much work if not more and will make a profit on every job.

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*Secretary Manager Electric Service League of British Columbia.

*President Henderson's Business Service and Canadian Manager Altorfer Bros., Co.

5,000	Ft. 14 Db. wire	.1½	$75.00
400	Ft. No. 8 Db. cable	.4¼	17.00
200	Ft. No. 4 Db. cable	.8¼	16.50
200	Ft. 1 conduit	.21	42.00
3	1" A condulets	.55	1.65
3	1" F condulets	1.40	4.20
5	1" LLB condulets	1.30	6.50
10	1" Porc. covers	.33	3.30
20	1" Blank covers	.30	6.00
3	FSS ½ condulets	1.50	4.50
5	1" J R G 2 conduletto fittings	.80	4.00
6	1" condulet elbows	.60	3.60
50	Outlet boxes	.25	12.50
50	Outlet box covers	.15	7.50
1	3x10x16 box		2.10
1	4x18x24 box		5.70
6	D. P. 100 Amp. cutouts	7.35	44.10
6	100 Amp. fuses	1.35	8.10
500	Knobs and screws	. 4	20.00
2,000	Ft. loom	. 3½	70.00
50	1" conduit locknuts	. 7	3.50
60	1" conduit bushings	.16	9.60
20	No. 316 flush receptable, complete	1.25	25.00
1	100 amp. D. P. 250 volts switch box		18.20
2	lbs. solder	.50	1.00
3	lbs. friction tape	.75	2.25
2	lbs. rubber tape	.75	1.50
1.000	3x5/16 tubes	. 1½	15.00
90	hours time 1st grade electrician	1.00	90.00
20	hours time 3rd year electrician	.75	15.00
50	hours time apprentice	.50	25.00
Inspection			9.50
			$570.20
	Less special 10% discount		57.02
			$513.18

Manitoba Electrical Association Planning for Coming Year

A meeting of the Executive of the Manitoba Electrical Association was held in the office of the representative, Mr. J. E. Lowry on Monday, July 3rd. Those present were—J. E. Lowry, F. H. Martin, G. R. Wright, John Whitsell, E. H. Smith, J. Rochetti, M. E. Deering, L. B. Dickson.

Plans for association activities for the coming year were the chief item of business and from the discussion that ensued it is quite apparent that a programme will be inaugurated that will carry a special appeal for every branch of the industry. Every member of the executive showed a keen desire to get busy and definite well thought-out opinions expressed show that these men are out to make the electrical industry wide and favorably known. The following committees were struck:—

Membership—G. R. Wright, Chairman; L. B. Dickson; M. E. Deering. The question of dues and field to be covered by membership campaign shall be the first duty of this committee.

Publicity—John Whitsell, chairman; H. C. Howard. Chairman has power to add to personnel. A committee to obtain material for electrical page shall be promptly arranged and this committee shall actively solict the support of all members in obtaining this material for Mr. Howard's use.

Public Relations—K. N. Forbes, chairman; John Whitsell; L. D. Dickson. This committee is to recommend those bodies with which we should seek affiliation and also report suggested activities with such as retail merchants, architects, builders exchange, etc.

Legislation—Prof. E. P. Featherstonhaugh, chairman; with power to add. Mr. Lowery will consult with Prof. Featherstonhaugh regarding work of committee in connection with existing license laws and apparent lack of administration of same.

Meeting & Programme—E. H. Smith, chairman; E. V. Caton; F. H. Martin. This committee is to arrange at once for picnic and also to make a special study of the question of an Electrical Club bringing in at some future time their findings and recommendations.

The atmosphere that prevailed throughout the meeting is best illustrated by citing the fact that Mr. Martin on behalf of The Manitoba Power Company extended an invitation to the members at large to visit as guests of The Manitoba Power Company, the new power development now in course of construction at Great Falls.

Morris E. Deering, late president of the Manitoba Electrical Association has accepted the onerous office of secretary for the coming year. Mr. Deering is Manager of the Northern Electric Company for the Winnipeg District.

Publicity Makes the Wheels Go Round

Publicity—that's another word for advertising. There are many ways to get it. You are putting out publicity when you advertise in your local papers, when you arrange window displays, when you distribute literature, when you demonstrate appliances. And they all pay because they all help create an impression and keep the fact that you are an up-to-date dealer, before the public.

Publicity is something that must be broadcasted continuously, for it is a well-known fact that, in order to obtain lasting and evenly-distributed results, an idea must be kept before the public constantly—or at least with some degree of frequency.

The history of business is full of instances where decline of prestige, dwindling of profits and even complete commercial failure have followed a curtailment of publicity. You can not, therefore, make any mistake if you take advantage of every opportunity to keep your store and the product you sell before the public mind.

There are many special ways of advertising that are good. Here are two or three that are being used with success. Perhaps they may give you an idea worth while.

One man has small tags which he attaches to all electrical fixtures which he sells in his store. One side gives data needed by the man who installs the fixtures and the other calls attention to the fact that the store handles all sorts of appliances. Another dealer has a contract with the telephone company which calls for an advertising tag to be attached to every telephone directory distributed in the surrounding territory.

Another good advertising stunt that has been used with gratifying results makes use of empty cartons. They are sealed up, given a coat of varnish to protect them from the weather and then, after a round hole is cut in the bottom they are ready to hang over fence posts out along country roads.

Dealers who have used this method of advertising say it pays.

The Municipal Transportation Commission, which is to study and report upon the advisability of the citizens taking over and operating the London Street Railway, has been announced by Mayor J. C. Wilson, of London, as follows: Sir Adam Beck, Philip Pocock, Ald. Gordon Drake and Ald. J. H. Childs.

Are You Getting Prospects This Way?

An enterprising firm of electrical dealers found out some very interesting things and collected a whole portfolio full of valuable information recently when they took advantage of the opportunity offered and arranged an exhibit at a fair held in their vicinity.

They also found out that, while there are a great many vacuum cleaners in use in their territory, there are probably as many more homes already wired for electricity but which have no electric cleaners.

Besides that, they learned the names and addresses of some 500 housewives who are interested in electrical appliances and who are, therefore, first-class prospects to follow up with sales effort.

They did all this, as indicated at the beginning of this story, as a result of taking advantage of the opportunity afforded by an annual fair, which is always an important event, and which, like all exhibits of a similar nature in hundreds of communities every year, attracts thousands of people.

As a specific means of getting names and addresses of prospects and information as to what appliances they owned, the firm announced that a vacuum cleaner would be given away on the last night of the show.

In order to obtain a chance on the cleaner, a prospect was required to fill out a card—giving her name, address and whether she owned an electric cleaner—and deposit it in a box provided for the purpose at the company's booth.

The thirteenth card drawn out of the box on the last night of the show won the cleaner.

While there were fully 60,000 people in attendance at the show during the week there were by no means that many chances given out on the cleaner. In fact, the dealer limited the number of cards to be distributed each evening, thereby adding incentive to obtain them—especially among women who were not owners of electric cleaners and who were, therefore, the very best of prospects.

Representatives of the dealer, in charge of the booth, lost no opportunities to demonstrate appliances to interested prospects and were kept continually on the jump. In addition, literature was distributed in large quantities.

While it would be beyond reason to expect that every woman who filled out a card, saw a demonstration or received a piece of literature would buy, it is a fact, nevertheless, that a surprisingly large number of sales that have been made since, are directly traceable to the efforts that were put forth at the fair.

The summer season is the open one for exhibitions of all kinds and it is the wide awake dealer who capitalizes the opportunity that they afford.

Company-Dealer Teamwork Can Put Over a Sales Campaign

The excellent results which can be obtained when dealer and manufacturer co-operate was strikingly shown in a recent campaign.

Though the population of the city in which the campaign was staged exceeds 100,000, there are only about 5,000 electrically lighted homes. With this market to draw from, and with four salesmen, in a period of two weeks, sales of Hoover vacuum cleaners were made by one dealer to the extent of over $5,000. Just how this result was secured is of interest to other dealers who are interested in increasing their sales.

The keynote of the campaign was its thoroughness. It was recognized at the start that half-way measures would result either in failure or half-success, neither of which would be profitable. The manager started to work on the campaign with the idea that it would be done right or not done at all.

Four salesmen were provided with cars; the announcing advertisment occupied sixty inches in three papers and subsequent advertisements were thirty inches and appeared daily.

In the dealer's store a fine floor display was given over almost entirely to the display of the appliance which was being featured and a large window was attractively decorated. All windows facing on two streets carried posters, while over the cashier's office on the interior a big flashing sign was installed bearing advertising for the special appliance and the words "Buy your Cleaner today."

The manufacturer of the appliance on which the campaign was centred also had two special representatives present throughout the campaign.

At the end of the first week the supply was exhausted and another order was placed by wire. Such a campaign is possible in many other towns but in every case the success achieved is largely a question of the effort put forth. Co-operation with the manufacturer and a determination to put the campaign over in a thorough fashion is the secret of success.

Boost Your Sales by Selling Something More

Here are a few ideas that will help the electrical dealer boost his sales total:

1. When you sell an appliance is your chance to explain about fuses. The customer may blame you when the lamps go dark if there are no fuses handy. Sell her an assortment.
2. The call for a motor for power purposes generally does not specify anything about switches; your chance to demonstrate and sell an enclosed safety switch.
3. Every woman wants a washing machine, but not so many of them know about the electric ironer; when you sell a washing machine do not lose the chance of demonstrating an ironer.
4. Toaster and hot plate go together; not toaster or hot plate, say toaster **and** hot plate.
5. Don't lose track of the possibilities in the way of additional sales of two-way plugs, feed through switches, etc. Every appliance sale gives an opportunity for this.
6. A customer who is sold on the comfort of one convenience is in good shape to be impressed with the merits of another—the electric washing machine and sew-motor logically follow the vacuum cleaner.

Daily Deliveries Tell the Story

An enclosed delivery truck having its sides covered with a well painted advertisement which harmonizes in color with his store front, has proved a good investment for one enterprising electrical dealer.

The background of the truck body is of delft blue, while the wheels are white with blue stripes—altogether a very striking car and one that attracts attention wherever it goes. The car is used to make daily deliveries, service calls and various other trips—through the business section and all over the residential part of the city as well.

As an advertising and utility proposition combined, the car is certainly effective. The tie-up between the store and the car is complete, due to the duplication of coloring on store front and car body, and the result is that there is an automatic association of ideas which works for the profit of the dealer who conceived the plan.

Lavender-Spence Co.

It is announced that the business that has been carried on by the Lavender-Spence Electric Co., of London, Ont., has been reorganized and that Mr. Spence's interests have been taken over by Mr. Jamer Elder. The business will in future be known as the Lavender-Electric Co. This business was first organized in 1920 by Mr. Lavender to supply electrical appliances and fixtures, wholesale and retail, and to undertake general contracting. Owing to increasing business, more capital was taken in and the sales end has been developed under the direct management of Mr. Elder who had been connected with some of the largest companies in Canada and the United States. The construction end of the firm is in charge of Mr. Lavender who was formerly with the Hydro-electric Power Commission and with the Northern Electric Co. This concern ranks well among the electrical firms in London, and signs indicate continued growth.

Descriptive Folder of New Hoover Cleaner

For the assistance of its dealer organization, The Hoover Suction Sweeper Company of North Canton, Ohio, has added to its literature a six-page folder descriptive of the company's latest product, Model 961, a new heavy-duty sweeper designed for use in clubs, hotels, offices and larger homes. This folder is smartly finished in three colors, with sand color and blue predominating, and contains a complete description of the merits of the new model. It is of a convenient size to be mailed as an enclosure with either a letter or a statement.

Emerson Contracts Awarded

Mr. George L. Guy, Consulting Electrical Engineer, Winnipeg, advises that the council of the Town of Emerson has approved the awarding of the contract for the labor of installing the distribution system of the town to Mr. B. Manger, Vingolf Apartments, Winnipeg; service transformers to the Packard Electric Company; intergrating watthour meters to the Canadian Westinghouse Company; copper wire, the Eugene F. Phillips Electrical Works and the Northern Electric Company; Limited; street lighting, constant current transformers, fixtures and control equipment, to the Canadian General Electric Company.

Mr. Fred Landon, electrical dealer and contractor, of Whitby, Ont., has recently opened an up-to-date store in that place. He will handle a full line of fixtures and appliances and is also going to go after the radio business. Mr. Landon reports business as very satisfactory just now.

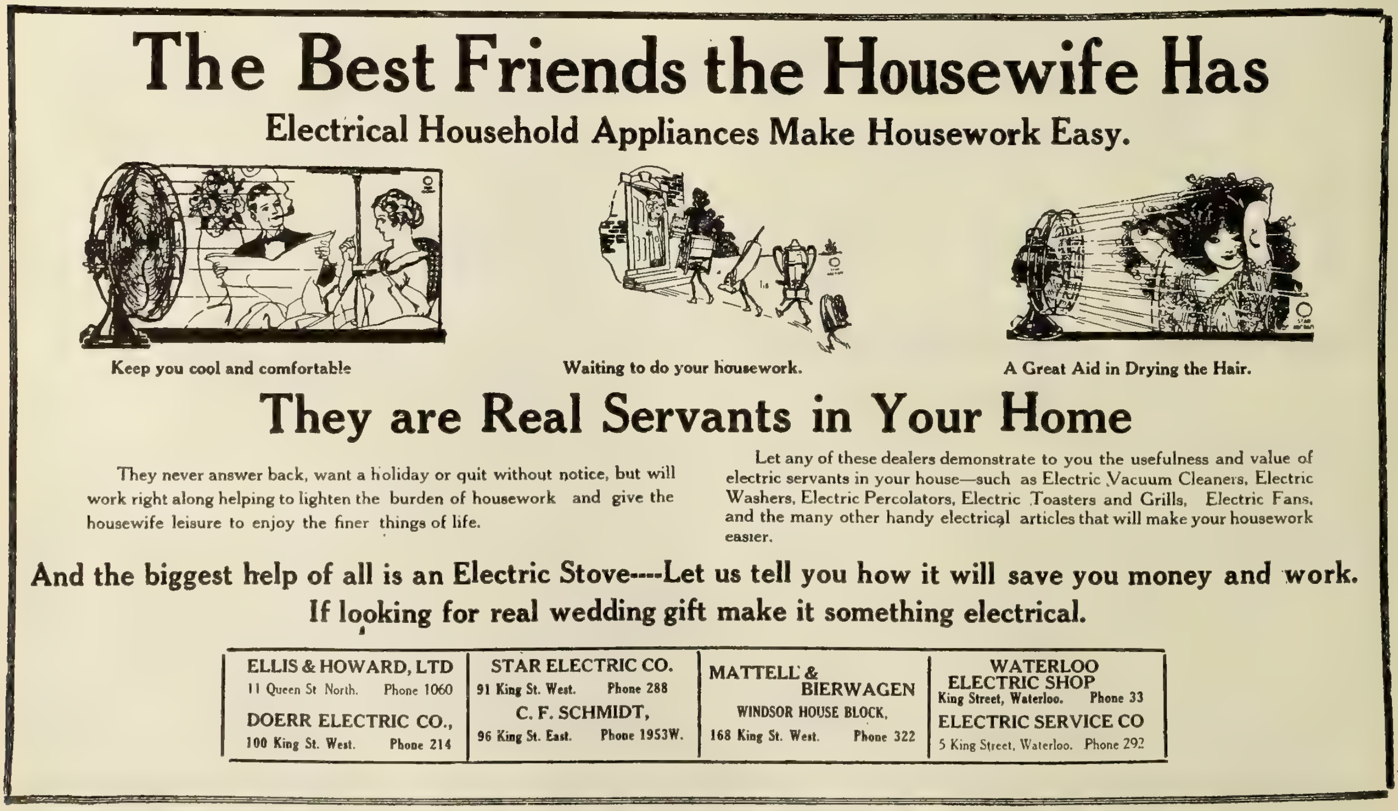
> **"We speak of the wealth of our mines, when, as a matter of fact, our best mine—water power—is above the ground, and the prosperity of the state depends upon this and the people to use it."**

Electrical Space Heater of Wide Application

An electric space heater that has many possible applications in industry, business, and the home and that can be installed by anyone is manufactured by the Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.

This heater, which is made in many sizes and in several wattages and voltages, can be used for heating metal, heating water tanks, baking and drying in ovens, heating presses, rolls and tables, heating isolated rooms and booths, ripening fruit, protecting windows from frost, drying foundry moulds, warming garages, drying clothes in winter, or wherever the temperature required does not exceed 800 degrees Fahrenheit.

For general air heating purposes, such as the warming of isolated rooms, booths, crane cabs, elevators, and garages, the heater may be mounted on angle iron frames, held in place by screws or bolts, and protected by wire screening. For heating metal tanks, pipes, and hot tables, the heaters are fastened against the metal surface and covered with heat insulating material.



The Best Friends the Housewife Has

Electrical Household Appliances Make Housework Easy.

Keep you cool and comfortable

Waiting to do your housework.

A Great Aid in Drying the Hair.

They are Real Servants in Your Home

They never answer back, want a holiday or quit without notice, but will work right along helping to lighten the burden of housework and give the housewife leisure to enjoy the finer things of life.

Let any of these dealers demonstrate to you the usefulness and value of electric servants in your house—such as Electric Vacuum Cleaners, Electric Washers, Electric Percolators, Electric Toasters and Grills, Electric Fans, and the many other handy electrical articles that will make your housework easier.

And the biggest help of all is an Electric Stove----Let us tell you how it will save you money and work.

If looking for real wedding gift make it something electrical.

ELLIS & HOWARD, LTD
11 Queen St North. Phone 1060

DOERR ELECTRIC CO.,
100 King St. West. Phone 214

STAR ELECTRIC CO.
91 King St. West. Phone 288

C. F. SCHMIDT,
96 King St. East. Phone 1953W.

MATTELL & BIERWAGEN
WINDSOR HOUSE BLOCK,
168 King St. West. Phone 322

WATERLOO ELECTRIC SHOP
King Street, Waterloo. Phone 33

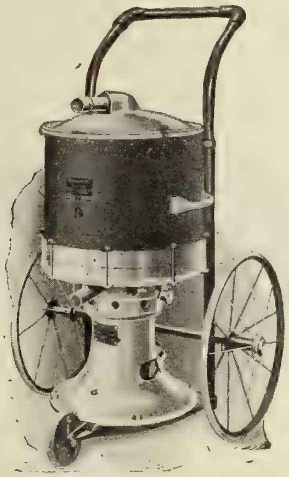
ELECTRIC SERVICE CO
5 King Street, Waterloo. Phone 292

Kitchener and Waterloo are doing good publicity work—Effective because they are working together

The Latest Developments in Electrical Equipment

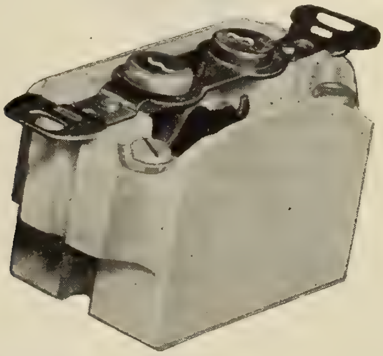
A Portable Vacuum Cleaner

A vacuum cleaner with some interesting features has been placed on the market by the Invincible Vacuum Cleaner Manufacturing Company, Dover, Ohio. This machine is equipped with a Westinghouse, 3/8 h.p. universal motor and a two-stage turbo fan running in ball bearings at 5,000 r.p.m., producing a vacuum of 33 inches of water. It handles from 90 to 100 cu. ft. of air per minute under varying conditions. The machine uses a dust separator of an easily removable type. An essential feature of the machine is its portability. The dust receiver and motor are mounted upon an iron frame which in turn is carried on two 16-inch rubber tired wheels, enabling the operator to easily move it around. Various attachments are supplied and include extra lengths of flexible cord and suction hose. It is claimed that the cleaner can be adapted to all kinds of work, such as that of cleaning floors, draperies, upholstery and bedding; a brush or felt attachment has been supplied for tile and wooden floors.



Locking Flush Switches

The Canadian General Electric Co. Ltd., are manufacturing an additional line of 5A, 250V single pole, double pole and 3 way locking switches to their standard line of flush push button switches. This has been accomplished by the adaptation of their sturdy and reliable standard switch mechanism to a metal key operating the rocker arm instead of the usual moulded push button stems. The switch blades are positively and safely insulated from the switch mechanism so that there is absolutely no danger of the key becoming alive in any way or at any time. These switches are designed to be installed with standard push button switch plates. One operating key is furnished with each switch with the intention that this key is to be entrusted only to an electrician or authorized person who has charge of lighting public buildings or halls where locking switches are installed.



The importance of the use of locking switches is often underestimated from a safety standpoint but the value of using these switches for controlling lights in dark passageways, hallways, dark or dangerous stairs, vaults, lavatories, etc., can be readily understood. The imperative use of the key prevents unauthorized or uninformed persons as well as mischievous children from turning off lights which for safety sake should remain burning or conversely turning on lights which are required to be out except for certain occasions.

Electric Glue Pot With Rheostat Control

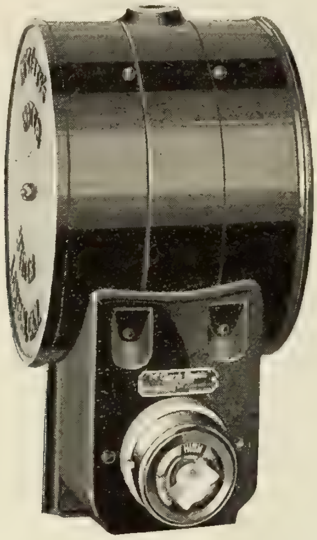
A glue pot with a rheostat control which permits an almost unlimited variation in temperature has been developed by the Westinghouse Electric & Manufacturing Company. The temperature of this new pot can be changed to meet different conditions, such as room temperature, climatic conditions, different grades of glue, or different kinds of work. The possibility of an unstable temperature, a frequent condition when gas is used for heating, has been eliminated, a better grade of work is possible, and the removal of a cause of time waste are some of the advantages from the use of this product. The addition of the rheostat does not deprive the user of any of the advantages of the electric glue pot. It still remains portable since the rheostat can be laid on a bench or shelf, the cord from the rheostat to the glue pot being long enough to permit ample movement for ordinary bench work.

Flexible Heating Pad

The flexible heating pad illustrated herewith is manufactured by the Ingersoll Electric Products Co., 109 W. Austin Ave., Chicago. A description was given in our June issue. A number of claims are made for this pad; it is said that it may be used with wet or damp applications, in any position, and fastened to the body in any manner.

A New Electric Water Heater

The McClary Manufacturing Company, Head Office, London, Ontario, have recently placed on the market an electric water heater so designed that it may be readily attached to the ordinary household boiler. The construction is such that any electrician can make repairs or adjustments that become necessary from time to time and in case of trouble, the unscrewing of one bolt will remove the cast iron casing. Standard elements are used on the heating units.



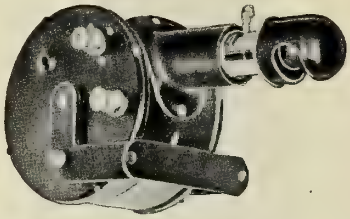
The steel plate at the bottom of the wire box can be removed and the necessary knockouts removed, for either open wire, or conduit connection. Connection is made to the ordinary tank with 3/4 inch galvanized iron pipe. The manufacturers emphasize the simplicity of the contrivance, and claim that the coils, bushings, wiring, etc., are all of the highest grade material. The heater is supplied for 110 volts, 220 volts and 110-220 volt three wire.

An Electric Hair Cutter

The A-C Electrical Manufacturing Company, Dayton, Ohio, is marketing an electric hair cutter which they claim to be free from vibration and noise. The cutter is equipped with an internal gear-reduction, universal motor, which will operate on all standard currents, including 32 volts, d.c. A special tension device, used to regulate the bearing of the blades, keeps the proper tension, and prevents hairs from dodging between the blades. It is claimed by the manufacturers that there can be no head of hair too heavy for these blades, as a perfect bearing effect is said to be obtained by a special arrangement of the teeth in the upper and lower blades. The curved face of the lower cutting blade enables the barber to cut close or long with only one set of blades. A reduction of working parts is obtained by a direct drive from the motor to the blades.

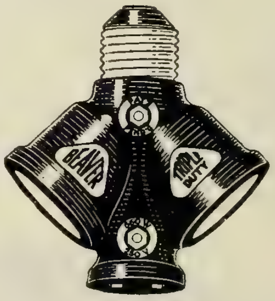
A Trouble Finder

The motorist needs a portable light in case of breakdown, and this want is met by the Cincinnati Specialty Manufacturing Co., Inc., 1907-17 Powers St., Cincinnati, Ohio. Their product consists of a reel, 3 inches in diameter and 2 inches wide, and an extension of 12 feet of reinforced cord, which enables any part of the car to be reached. Through a movement of the attaching arm, the reel is readily adjustable so that it can be placed in any desired part of the car. An automatic lock is used to hold the cord securely at any point. A slight pull releases the lock and the cord is then automatically rewound on the reel. Attachment is readily made to any car by two bolts.



A Three Connection Socket

A new socket, which does triple duty, has been placed on the market by the Beaver Machine & Tool Company, Inc., Newark, N. J. The socket allows of three connections in the space occupied by the ordinary double duty socket; there are many cases where it is desired to have two lights and a household appliance connected to the same outlet, and this socket meets the demand. The manufacturers claim that materials are of the highest grade throughout; the case is highly polished and it is said that its ease of installation and neat appearance make this device suitable for any room in the house.



The advantages derived from arc splitters in conjunction with the magnetic blow-outs of contactors are explained and illustrated in a publication, known as Leaflet No. 3429, which has recently been issued by the Westinghouse Electric & Manufacturing Company, East Pittsburg, Pa.

Electric Railways

British Columbia Electric Railway Company Changes System of Operation Overnight

Few street railway superintendents have been faced with the situation which confronted the officials of the British Columbia Electric Railway Company in Victoria, B. C., in the closing months of the past year. The government, in the early part of the year, announced that the long delayed action of changing the road traffic rule from left hand to right would take effect on the first day of January 1922, and about the beginning of September the management issued instructions that by the same date all cars of the local system were to be in shape for one-man operation.

Negotiations leading to this latter decision had been in progress for some time previously, the company having sought and obtained the approval of both the municipal authorities and the Provincial Government on the question of reducing their operating costs in this manner, it being pointed out that it was becoming quite impossible for the service to continue in operation, with the heavy annual deficit which for some years had been in evidence. The schedule of fares had already been revised and a standard 6 cent fare established, but this in itself was not sufficient to relieve the situation and the proposed reduction of operating costs was shown to be essential.

As the system had to be operated up to midnight of December 31st under the old rules, it is apparent that a good deal of ingenuity had to be exercised in so arranging the work of changing over that as much as possible would be accomplished before that date without taking all the transformed cars completely off the road. In view of the intention to change to one man operation, however, the company placed on order ten standard Birney safety cars, and as delivery of at least three of these was anticipated before the date for the change over, the situation was relieved to that extent.

Two General Types

Leaving out of the question the Birney safety cars, which are a new type on the Victoria system, the company operated two general types of cars in the city for passenger service, sufficiently described for present purposes by the designations "Double-end" and "Single-end." The latter type is of course operated on routes where a loop or wye makes reversal of the car possible for the return trip; the former are in use where such facilities do not exist. Both are a heavy type of double truck car, with a total capacity of about 70 passengers.

As a preliminary to entering on the full programme of work, two cars were brought in to the barn early in October for experimental purposes, so that some idea might be obtained of the time that would be required to make the changes, and definite plans laid for completing the programme in time. It was found that 25½ days, with a crew of about twelve men, were required to complete the work on the double end type. The other experimental car was of the single end type and took 37½ days, but was not regarded as a fair test, as this particular car had been in collision with some heavy fire-fighting apparatus and a great deal of repair work unconnected with the change-over had to be accomplished as well.

Increasing the Efficiency

The time required for the work was later cut down about two-thirds, which was partly due to the growing efficiency of the crews engaged on the work, and partly to the fact that on the first cars a good deal of changing about was necessary, as well as the preparation of templates and working schedules for the bulk of the programme to follow. The double end cars had to be changed from left-hand, rear entrance, to right hand, front entrance. The changes in car structure necessitated by this were quite comprehensive, and included the complete removal of the two bulkheads which had partitioned off the drivers' and conductors' compartments. The old exits were entirely closed up, and a window with sliding sash installed on the left side next to the operators' seat. New doors were installed at the right side, of the sliding and folding type, operated by pneumatic control in place of the former hand control. The lighting system was entirely revised, and step lights were installed over each entrance door, with box shields to keep the light from the operators' eyes. No lights were placed in the vestibules, and spring curtains were arranged to shield the operator from light from the body of the car.

The single end cars were similarly arranged as far as concerns the driving or front end. The doors were made identical with those installed on double enders, and front bulkhead removed. No change was made at the rear end, however, with the exception of placing a seat in the compartment, which is now in use as a smoking compartment. The rear exit door, as it is now, was originally the front exit and the rear compartment under present conditions was previously the drivers' compartment and the front of the car. The rear exit is purely for emergency use, and under normal conditions remains locked pneumatically. The old controller and straight air brake valves remain at this end of the car, and are used for handling the car around the barn and yards when necessary.

Standard Safety Equipment

All cars were formerly equipped with what is known as the straight air system of braking. With a view to bringing the system completely up-to-date from the safety standpoint, all cars are now fitted with standard safety equipment, Westinghouse Type 28M Motorman's brake valve, with controller pilot valve and emergency valve. This equipment is so arranged that an emergency stop can be made by only two motions on the part of the operator. The first is of course the controller handle motion which cuts off the current. The second is the brake valve motion to extreme right hand position. The sequence of operations then carried out automatically by the braking mechanism is, 1st, track sanding, 2nd, full tank pressure to brakes through the operating cylinders, 3rd all exit, entrance and emergency doors unlocked so that they may be opened by hand.

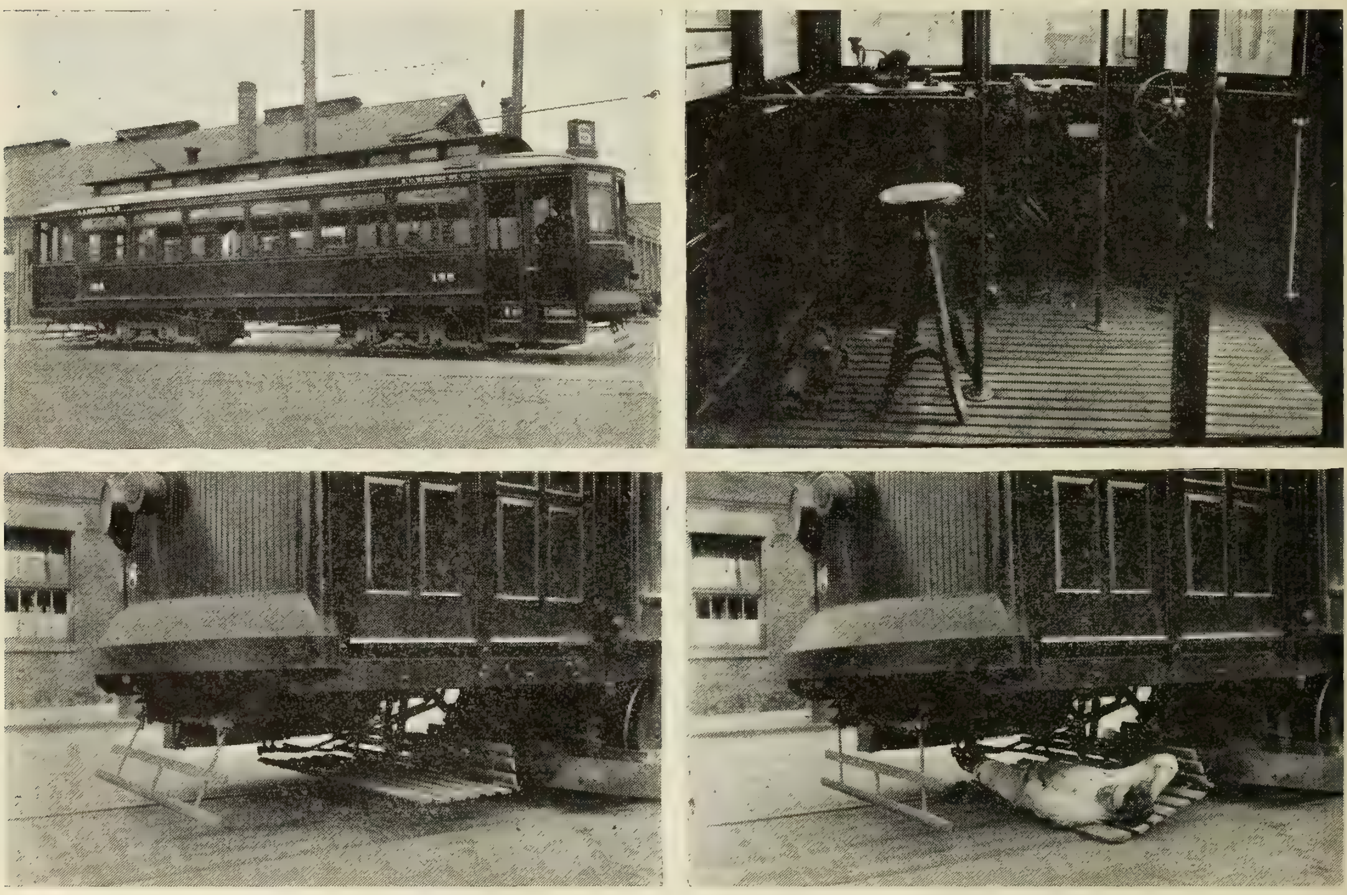
The so-called "dead-man-control" is also provided for. In the event of the operator leaving his post under any contingency, such as the imminence of a collision, complete automatic control at once takes place, and the car brought to an emergency stop. The sequence of operations under these conditions is as follows:—1st, pressure air is admitted to a small cylinder and operates a piston which trips the circuit breker and cuts off all current. 2nd, tracks are sanded, 3rd, brakes applied with full reservoir pressure, and 4th, all doors unlocked as before. While the sequence is maintained as described, the whole operation is practically instantaneous and constitutes a safety device which has already on several occasions proved its efficacy to the complete satisfaction of the officials of the system.

The contingency of a collision which might destroy the valves and piping at one end of the car is also provided for, by means of an emergency valve and double check valve which are located in the centre of the car where furthest removed from possible damage. A serious leak or breakage in the pipe system will cause these to operate and bring the car to a stop as before.

New Fenders

In addition to all the changes noted above a new type of fender has recently been made standard on all cars of the company's system. This is the "H. B. Lifeguard" fender, which consists of two principal parts. The fender proper is underneath the car, and under normal conditions hangs with its lower edge about 6 inches above the track. A small fender hangs just under the front of the car body however, and acts as a trigger to the fender proper, when any person or other obstruction is struck by the car. The large fender is then automatically dropped until its edge rests on the rails, and picks up the body in safety. This feature of the equipment has also given great satisfaction since its installation, and has been found to act with great certainty when the need arises. As an example of its sensitiveness it is interesting to note that for some time considerable trouble was experienced due to the fender operating without apparent cause. This trouble persisted for some weeks, and then stopped, and the reason was not discovered until the trouble was found to be again as bad as ever for a few days in coincidence with a stiff breeze. It was then established beyond a doubt that the fenders were dropped by the action of the wind upon the trigger piece, and it has become necessary to reduce the exposed area somewhat so as to obviate the inconvenience caused in this manner.

A new signal system for stop signals to the operator has also been installed recently. The old system was simply the standard electric buzzer operated by dry cells. The new system, which has proved in practice much more reliable, is the Faraday High Voltage Signal system, and takes current direct from the trolley through a resistance.



Left above—Right hand operation, sliding and folding doors in open position. Right above—Control arrangement. Below right and left—Life Guards

Capital Investment

Some idea of the capital investment represented by the changes may be obtained from the fact that the alterations to rolling stock alone, apart from track and overhead work, amounted to about $2,000.00 per car. About 100 extra men of various trades were employed by the company during the last three months of the year and a reduced force until the end of March, when the work was practically completed. Although a great deal of work had been done previous to December 31st., much naturally remained in completing the tracks and overhead work, repair to roads, etc., and this work was carried out at considerably reduced pressure, as the system was put in condition to operate temporarily during the old year. Until March however, two men were kept on as crew on all cars, and in this transition period the permanent force was organized under the new conditions.

It was found that not all of the men previously employed either as motormen or conductors were able to adjust themselves to the changed conditions. The requirements are naturally somewhat exacting, as the operator has the responsibility of running his car, the collection of fares, which are deposited by the passengers in fare boxes of a special pattern, sale of tickets and making change, and general supervision of passengers from the safety standpoint.

And apart from all these requirements, the company was interested in having men in charge of the cars who would maintain a pleasant relationship of the company with the public, instead of antagonizing people by nervous or discourteous conduct. It is greatly to the credit of the company that all this was accomplished without hitch or serious accident of any kind. The mechanical and engineering details of the work were under the direct supervision of Mr. C. A. Cornwall, M.E.I.C., assistant superintendent.

London City Council to Regulate Bus Licensing

The London City Council will shortly take up the matter of a proper regulation and licensing of buses. It is claimed by some of the Aldermen that it is unfair to make the street railway pay its share of the cost of paving on streets where its lines run and then permit buses to run with only the payment of an insignificant license fee. It is also suggested that every bus owner be compelled to carry an insurance policy for not less than $25,000 to cover damage done by him to life or property in case of accident.

Cost per Passenger is Less

At a recent meeting of the St. Thomas, Ont., City Council, Manager Johns, of the street railway, submitted a comparative statement of car mile costs for 1922 and 1921, showing that the cost of carrying each passenger per car mile this year has averaged 7.1 cents as against 10 cents in 1921. The passengers carried per car mile during June of this year averaged 3.51 as against 2.21 in June 1921; the revenue per car mile for June 1922 was 11 cents and 14.6 cents in June 1921; the expense per car mile in June 1922 was 24.25 cents per car mile and in June 1921, 22.5 cents.

"The expense per car mile is greater than in 1921 since the present operation necessitates fewer car miles and the fixed charges, debentures, payments, interest, etc., are the same," the manager reported. "However the passengers carried are more in proportion to the mileage operated than last year and the cost per passenger has materially decreased."

Better Returns

Weekly returns of the operation of the Edmonton street car system indicate, according to Commissioner Yorath, that that utility is showing a constant increase in revenue and in the number of passengers carried comparing the figures with those for the same periods last year.

In recent week there were 222,083 passengers carried as compared with 214,426 during the corresponding week last year. There is a gradual increase of nearly $100 a day in revenue. There are 40 cars in regular and constant operation as compared with 35 at the same time last year.

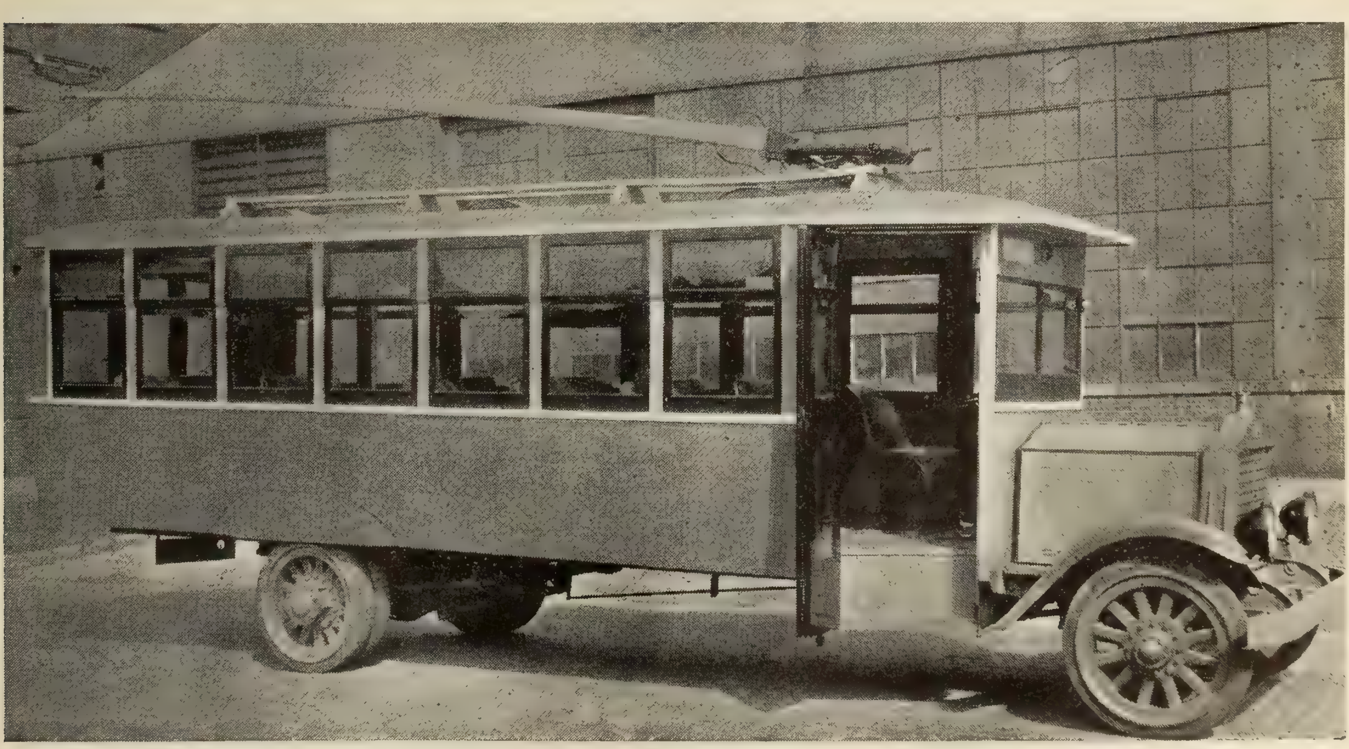
Opposes Increased Fares

On last year's operations the Ottawa Electric Railway showed a profit of less than 5 per cent.

Major Burpee, says the company is strongly against the idea of raising the nickel fare on the ground that street car riding would become to many a burdensome necessity.

Improved Financial Position

The financial position of the Nova Scotia Tramways & Power Company is reported to have materially improved during the last six months, and through steadily increasing earnings and decline in operating expenses the company is working into a strong position.



On the Mount Pleasant line the Toronto Transportation Commission is operating its first Trolley Bus, as illustrated

Current News and Notes

Collingwood, Ont.

Mr. M. A. MacGillivray, of Collingwood, Ontario, has been getting plenty of wiring business lately. He has just about completed the re-wiring of the Public Library and has secured several new contracts which include that of the New Empire Theatre, and a remodelling job on the Dominion Hotel. This latter building is being converted into apartments, with store and office included in the same building; the job calls for 9 electric ranges, and necessitates the installation of 13 meters.

Cowansville, Que.

Messrs. Buzzell & Lorimer, of Cowansville, Quebec, have recently started in the manufacture and merchandising of radio and electrical apparatus. They report a rush of business.

Hamilton, Ont.

Accepting the legal advice of the City Solicitor, F. R. Waddell, K. C., that the new Hydro-radial Act supersedes all other by-laws heretofore passed, and that the latter are, therefore, declared null and void, the Board of Control of Hamilton, on July 6, resolved that the city should request the Hydro-electric Power Commission of Ontario to return the $6,478,928 in debentures which Hamilton deposited as a guarantee against a deficit in connection with the operation of the proposed Hydro-radial from Port Credit to St. Catharines.

Langley Prairie, B. C.

An increase in the demand for telephone service has resulted in the installation of a 15-pair cable which will add considerably to the capacity of the local service.

London, Ont.

Initial steps were taken by the Finance Committee of the London city council recently to take over the properties of the London Street Railway. A resolution was introduced by Mayor Wilson, calling for the appointment of a commission to go into the whole question and make a report within three months' time.

Montreal, Que.

Mr. Eugene Vinet, who has acted as secretary of the Canadian Electrical Association for a number of years, during which time very marked progress has been made in this association, has resigned and been succeeded by Mr. Louis Kon. Mr. Vinet has moved to Chicago. Mr. Kon is a well-known figure in the Montreal district, where he is secretary of the Electrical Co-operative Association, Province of Quebec, and of the Contractor Dealers' Associations of that province. His appointment as secretary of the Canadian Electrical Association should prove to be a step in bringing the different electrical interests into more intimate cooperation.

New Liskeard, Ont.

In our last issue we published a preliminary report on the Matachewan Power Company, Ltd., at Indian Chute, on the Montreal River. Sutcliffe & Neelands, engineers in charge of this work, now advise us that contracts have been awarded as follows: Boving Hydraulic & Engineering Company, waterwheel and hydraulic equipment; Canadian Westinghouse Co., generator and electrical apparatus; English Electric Co. of Canada, transformers; Northern Aluminum Co., transmission material.

Ottawa, Ontario.

The Canada Gazette announces the incorporation of the Radiola Company of Canada for the purpose of manufacturing and dealing in wireless equipment of every description. Capital stock $100,000. Head office Ottawa.

Paris, Ont.

Since 1914, the electrical power used in Paris, Ont., has increased from 158 to 671 horsepower.

St. Catharines, Ont.

Mr. Arthur J. Flowers has recently taken over the interest of Mr. Fred Muller of the Muller-Flowers Electrical Repair Co., and is re-organizing the business which will in future be known as the Canadian Armature Works, specializing in the manufacture of coils for motors, and all types of electrical equipment, also street railway coils and general electrical repairs.

South Vancouver, B. C.

The South Vancouver Council, on June 29, recommended the signing of a contract for street lighting with the B. C. Electric Company. The signing of this will mean the scrapping of the present arc lights, and the substitution of nitro-tungsten lamps.

Toronto, Ont.

The Ontario Gazette announces the incorporation of Brooke and Bastedo, Limited, with a capitalization of $40,000. The new company are licensed to carry on the business of electrical contractors and builders and to deal in all kinds of electrical appliances, etc. Head office, Toronto.

If we who are engaged exclusively in the electrical game are to hold and extend the appliance business, we must all face the situation squarely and adopt attractive measures to gain an increased volume of sales.

Vancouver, B. C.

The East Kootenay Power Company is issuing $2,000,000 of 7 per cent, first mortgage, sinking fund gold bonds. The offering is being made at 97½ and carries a bonus of 2½ shares of no par value with each $1,000 bond.

Welland, Ont.

Mr. H. F. Scherer, for a number of years manager of the Municipal Electric System in Smiths Falls, Ont., recently resigned to accept a similar position in Welland, Ont., where the greater industrial development should offer Mr. Scherer a wider scope for his ability and ambition.

Winnipeg, Man.

Manitoba Government Telephones monthly report for May submitted by Commissioner Lowry, shows a surplus of $5,568.72 as compared with a deficit of $71,205.49 for the corresponding month last year. The deficit for the year 1922 has been reduced to $14,000 against a deficit of $369.146 for the corresponding six months of 1921. The total revenue for the month was $264,720.06. Expenditure $153,111.81.

Wiring Contracts Awarded

Birch Cliff, Ont.

To Smart & Walsh, 130 Bingham Ave., on $37,500 addition to school.

Blairmore, Alta.

To F. Dunkley, Blairmore, Alta., on $15,000 store and apartments.

Bowmanville, Ont.

To G. Bounsall, on $4,000 residence for H. H. Dilling.

Brantford, Ont.

To Ingleby Electric Co., 187 Dalhousie St., on $3,000 residence.

To Turvey & Gunn, 44 Eagle Ave., on $40,000 factory.

To Lyons Electric Co., 72 Colborne St., on $40,000 residence, Ava Road.

Bridgeburg, Ont.

To Anger Electric Co., on $6,000 residence, Wintermute St.

To C. J. Gummel, on $5,000 residence, Highland Ave.

To W. Kent, Amigari, Ont., on $5,000 residence, Wintermute Street.

Charlottetown, P. E. I.

To C. Hopkins, 89 Sydney St., on $5,000 residence, Rochford St.

Chatham, Ont.

To Geo. Moore, Barth St., on $5,500 residence, Ellwood Avenue; on $4,000 residence, Lansdowne Ave.

Crescent Beach, Ont.

J. H. Jamieson, Fort Erie, on 5 summer residences, totalling over $25,000, Crescent Beach.

To C. Beaiss, Ridgeway, on $4,300 summer residence, Crescent Beach.

Edmonton, Alta.

To Bert L. Perry, 10,041 102nd St., on $23,000 stores, Jasper Avenue.

Fort Erie, Ont.

To H. Jamieson, on $5,000 residence, Battery Street.

Fredericton, N. B.

To Allen Staples, 560 Queen St., on $5,500 residence, Grey St.

To Wm. D. Boone, North Devon, on $4,500 residence, Aberdeen St.; on Sunday School, $25,000, Church Street.; on $5,000 residence, St. John St.; on $3,500 residence, Regent St.

Guelph, Ont.

To Anderson & Pfaff, Quebec St., on $13,000 residence, Oxford & Dublin St.

Halifax, N. S.

To H. H. Steeves, 70 Young St., on three residences, $13,500., Garden St.

To L. E. Estling, 14 Merkel St., on $4,000 residence, North St.

To Cragg Bros. Ltd., Barrington St., on offices of Nova Scotia Trust Company.

Islington, Ont.

To J. Deemert, 34 Pauline Ave., Toronto, on gasoline service station, Bloor & Dundas Sts.

Kingsville, Ont.

To Lambert Tofflemire, on $4,500 residence, Prospect St.; on $6,000 residence, Queen St.

Kingston, Ont.

To King, 389 Alfred St., on 3 residences for Thos. A. Andre.

Kitchener, Ont.

To Jos. Schweitzer, King St. Waterloo, on 2 residences, $4,800 each.

To Waterloo Electric Shop, Waterloo, on $5,000 residence, Louisa St., Kitchener,

To Doerr Electric Co., King St. W., on Suddaby School; on $50,000 church rectory, Duke St.

To Otto Reiber, King St., Waterloo, on two $4,200 residences, Tuerk & Strange Sts.

Merritton, Ont.

To J. Jones, Antwerp St., St. Catharines, on $10,000 addition to school, Merritton, Ont.

Mimico, Ont.

To Warner & Fordyce, on $4,000 residence, Primrose Avenue.

Moncton, N. B.

To Duffy & McCarthy, 165 Lutz St., on $7,000 residence, Archibald St.; on $40,000 business block, Main St.

To A. B. Belliveau & Co., Reed St., on $6,000 residence, Archibald Street.

To J. W. McCarthy, 202 St. George St., on $4,500 residence, Lester Ave.; on $6,500 residence, High St.

Montreal, Que.

To Mead Electric Co., on residence and garage, Prince Arthur St.

To J. A. St. Amour, 2171 St. Denis St., on $210,000 church and sacristy; on $125,000 addition to presbytery and sacristy, Visitation St.; on two cottages, $30,000, McDougall Ave.

To W. Rochon, 454 Parc Lafontaine, on $300,000 church, on Ontario St.

To W. Cousineau, 1659 Notre Dame St. W., on 4 stores and 8 flats, valued at $25,000.

To Vincent & Say, 344 Union Ave., on $15,000 store and apartments, Sherbrooke St. W.

Niagara Falls, Ont.

To Upper Electric Co., Main St., on 4-room school, Falls View, Contract price $475.

North Bay, Ontario.

To Mason & Campbell, 19 Main St. E., on $4,500 residence, Klock Ave. & Front.

To Herbert & Co., on $3,000 residence, on Queen St.

Oakville, Ont.

To Fred. Tizard, on $6,000 residence, on Maple Ave.

Ottawa, Ont.

To Mr. Booth, c.o architect, on $14,000 residence, Marlboro Ave.

To C. Gould, Grove Ave., on $12,400 residence, Lees Ave.

To Mr. Hardy c/o F. Mills, 29 Thornton St., on $5,500 residence, Broadway Ave.

To H. L. Allen, 272 Bank St., on $7,000 residence, Cartier St.

To E. G. Tressider, on residences, valued at $15,000, Sunnyside Ave.

To Stan. Lewis, 63 Metcalfe St., on $40,000 office building, Sparks Street; on $10,000 residence, Carling Ave.

To A. Davis, on $8,000 residence for Mr. Jacques, Experimental Farm.

To E. Headly, 645 Echo Drive, on store and apartment, Bank St.; on $10,000 residence, Riverdale Ave.; on $5,500 residence, Broadway Ave.; on $6,500 residence, Cameron St.

To W. Cowell, Westboro, on $5,000 residence, Grove Avenue.

To P. Ackroyd, 416 Bank Street, on $7,000 residence, Cameron Street.

To A. Davis, LeBreton St., on $3,500 residence, Caroline Avenue; on $5,500 residence, Bronson Ave.; on $5,000 residence, 5th Avenue.

Outremont, Que.

To W. Cousineau, 1659 Notre Dame St. W., on $11,500 residence, Davaar Ave.

Point Grey, B. C.

To E. J. Peel, 6330 McDonald Street, Vancouver, on $6,000 residence, Point Grey.

Riverside, Ontario.

To Eugene Mailloux, Riverside, on $42,000 school.

St. Mary's, Ont.

To A. Willard, St. Mary's, on alterations costing $30,000, to school.

St. Catharines, Ont.

To F. E. Carley, on School, Grantham Twp., Niagara St.

To Clifford Electric Co., 19 Ontario St., on $5,000 residence, Glenridge Avenue.

Sault Ste. Marie, Ont.

To O. C. Carney, 516 Queen St. E., on $8,770 garage.

Stratford, Ontario.

To. W. Gaul, Charles St., on four $3,000 residences, Romeo and Ontario Streets; on $6,500 residence on Avon St.

Sydney, N. S.

To Mr. Shefford, Townsend St., on $4,500 residence, Union St.

To McKay Electric Co., 405 Charlotte St., on $4,500 residence, George Street.

To J. Donovan, 17 Margaret St., on $5,500 residence, Prince St.

Thunder Bay, Ont.

To C. Beaiss, Ridgeway, on two $5,000 summer residences, Thunder Bay.

Toronto, Ont.

To P. J. Dunn, 3124 Dundas W., on $7,000 residence, Willard Street.

To St. Clair Electric Co., 1108 St. Clair Ave., on $7,500 residence, Arlington Ave.

To A. W. Haynes, 27 Carrol Ave., on $6,000 pair residences, Hanson Street.

To Bennett & Wright, 72 Queen E., on $12,000 residence and garage, Arlington Ave.

To Sam. Whittaker, c/o owner, 49 Triller, on 2 residences, value $9,000 each, Barrie Ave.

To Ramsden & Roxborough, 36 Front St. E., on $80,000 office building, Queen St.

To Canada Electric Co., on $90,000 collegiate building (Humberside.)

To W. E. Sheppard, 170 Indian Grove, on 2 residences $4,000 each, Atlas St.; on 2 residences, $5,500 each, Atlas St.

To Cross & Sneal, 9 Mulberry Crescent, on 2 residences, $7,000 each, Norman Ave.

To Richardson & Cross, 81 King E., on service station, Queen & Indian Road.

To Wm. Burman, 277 Ashdale, on 6 pair and 1 single residence, valued at $40,000 on Second Ave.

To Nickol & Fagan, 111 Logan Ave., on 3 pairs residences, $8,000, Scarboro Road; on 2 pair and 1 single residences, valued at $5,000 a pair, on Alton Ave.

To A. G. McLeish, 579 Keele St., on $8,000 residence on Mossom Road.

To Geo. Armstrong, 1217 College St., on 30 bungalows, $7,500 each, Briar Hill.

To A. J. Morrison & Co., 269 Albany Ave., on $8,000 residence, St. Andrews Gardens.

To Wm. A. Dean, 146 Jarvis St., on store with dental suite, $12,000, Harbord Street.

To S. Johnston, 111 Curzon St., on $7,000 store & apartments, Danforth Ave.

To Moss & Stocks, 1145 Yonge St., on $11,000 residences, Oriole Gdns.

To J. Kerr, c/o Henry Massie, 674 Pape Ave., on $4,500 residence, Carlaw Avenue.

To Clegg Bros., 79 Blackthorne Ave., on 2 residences, $5,000 each, Woolfrey Avenue.

To Canada Electric Co., 175 King E., on Kitchener School addition, $75,000. Contract price, $1,987.

To L. Warburton, 2 Kingsmount Park Road, on pair of residences, $8,000, Greenwood Ave.

To N. McLeod, 808 Danforth Ave., on pair of residences, $8,000.

To S. Johnston, 111 Curzon St., on $4,000 residence, 64 East Lynn Ave.

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To Fox & Mainwaring, Pemberton Building, on $10,000 residence, Cadboro Bay Road.

Waterloo, Ont.

To Otto Reiber, 84 King St. S., on $4,500 residence, Albert St.

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To McDonald-Willson Lighting Co., 309 Fort St., Winnipeg, on $89,000 school, Mountain & Parr.

To Gamble & Willis, Ltd., 306 Notre Dame Ave., on $79,988 school, opp. Selkirk Park.

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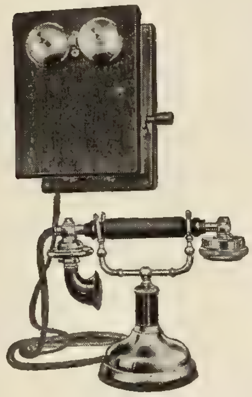

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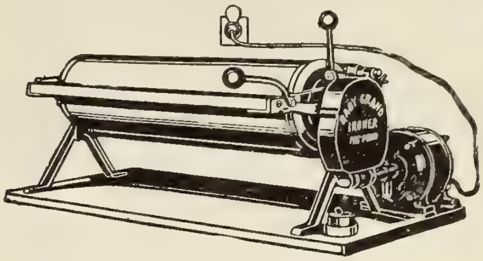

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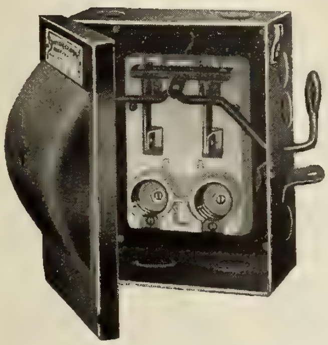

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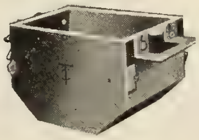

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Porcelain Pipe Fitting covers all sizes ½ to 2" metal covers sizes ½" to 2"

Ground clamps all sizes

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London, Ont. - - Canada
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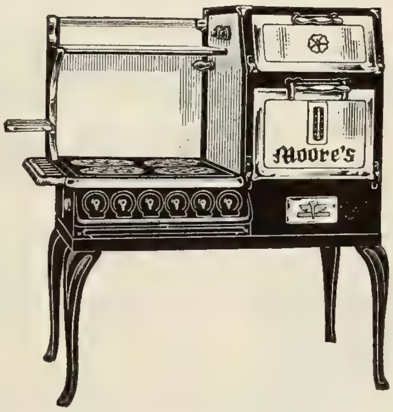

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Switches are countersunk, easy to get at. Fuse box convenient at front. Four nine inch burners, 3 heat. Element in Warming Oven. Oven 18 x 18 x 12. Light over top cooking holes.

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Wanted—Armature winder, motor repairman A.C., D.C. long experience, mention length of time, where, salary, commencing when, age. Also one assistant and one office and road salesman. Used motors and dynamos. Scott Bros. Electric Company, Windsor, Ont. 14

Position wanted—by energetic, single man age 32, technical training and eight years' practical work, with largest steel, copper and coal concerns in East and West, at present in Northwest mining town and desires to move East. Any commercial or industrial opening with prospects acceptable. Box 958, Electrical News, Toronto. 14-16

Wanted Armature Winder, A.C., D.C., piece work. Shop and materials furnished, mostly small sizes Contractor engages own boys, girls or men when needed. Out of town position—capable man, permanent, also one bookkeeper, well experienced modern systems, salesman, office man. Give full particulars, salary, age, in first letter. Box 960, Electrical News, Toronto. 14

Appliance Salesman having several years practical experience in electricity, selling, advertising and general office work, desires position as manager for retail store or appliance department. At present with Eastern Ontario Electric store as head salesman. Young and aggressive, excellent reasons for desiring change. Box 957, Electrical News, Toronto. 14

Electrical Business for Sale

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is open to consider a Franchise Agreement with the owner of an Electric Lighting Plant for an electric light service for the town. For particulars, apply to the Secretary-Treasurer, Hardisty, Alberta. 13-14

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1 CROCKER WHEELER—150 H.P. 750 R.P.M. 550 volts 25 cycle 3 phase slip-ring 3 bearing Induction Motor with slide rails pulley and secondary controller for two minute starting duty only. With controller is furnished one primary interlocked oil switch with No-voltage and overload relays.

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48—Type G, Packard	—5-10 Amp	—$3.50	each.
15—Type E, Packard	—5-10 Amp	— 1.00	each.
50—Type B, Ferranti	—5-10 Amp	— 5.00	each.
38—G	—5-10 Amp	— 1.00	each.
5—Stanley	—5-10 Amp	— 1.00	each.

The above meters are 110 volt, 2 wire, 60 cycle meters, and items one and three have been adjusted to pass inspection, items two, four and five have not been adjusted.

Hydro-Electric Power Commission of Ontario,
Engineering Dept., 190 University Ave.,
Toronto.

14-17

Protests to the Government for its failure to pass legislation licensing electrical workers, which legislaton was looked for last session by the Canadian Electrical Trades Union, has brought the promise from Hon. Mr. Rollo, Minister of Labor, that a conference between the interested parties on the proposed legislaton will be held this summer.

THERE is business to be had in the construction industry and the aggressive contractor, material dealer and manufacturer is getting business—lots of it.

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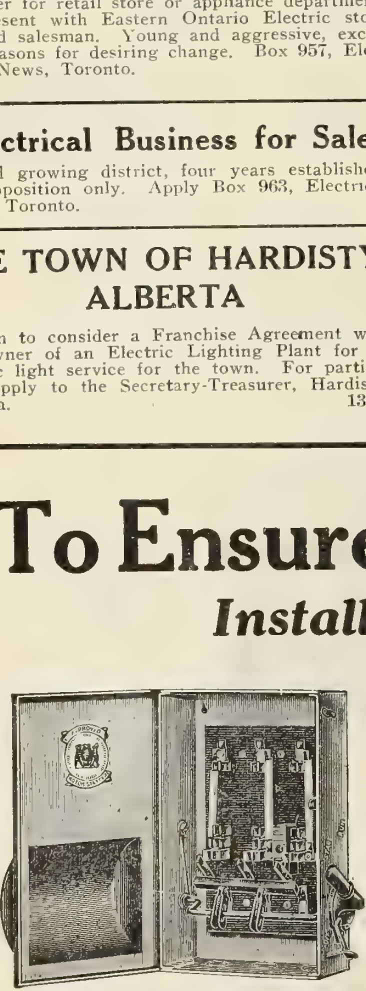
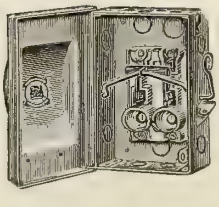
Catalogs, prices and full details of "the line that always satisfies" forwarded upon request.



Motor Starter Cat. 5530. Single Throw Motor Starter designed for starting 2 and 3 phase motors. This starter gives entire satisfaction under all conditions.



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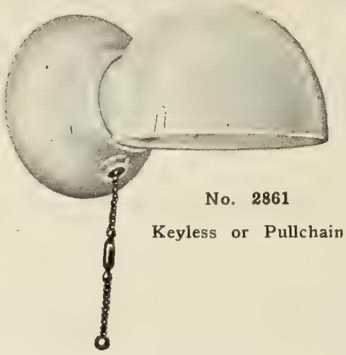

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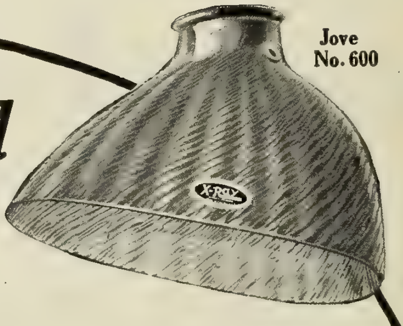

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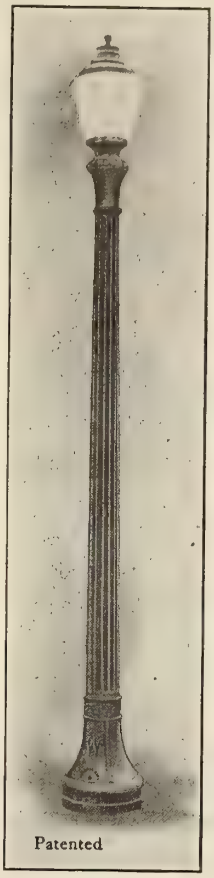

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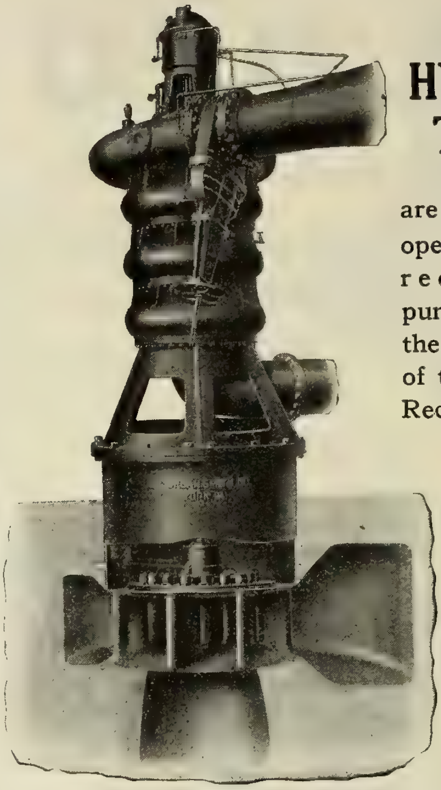

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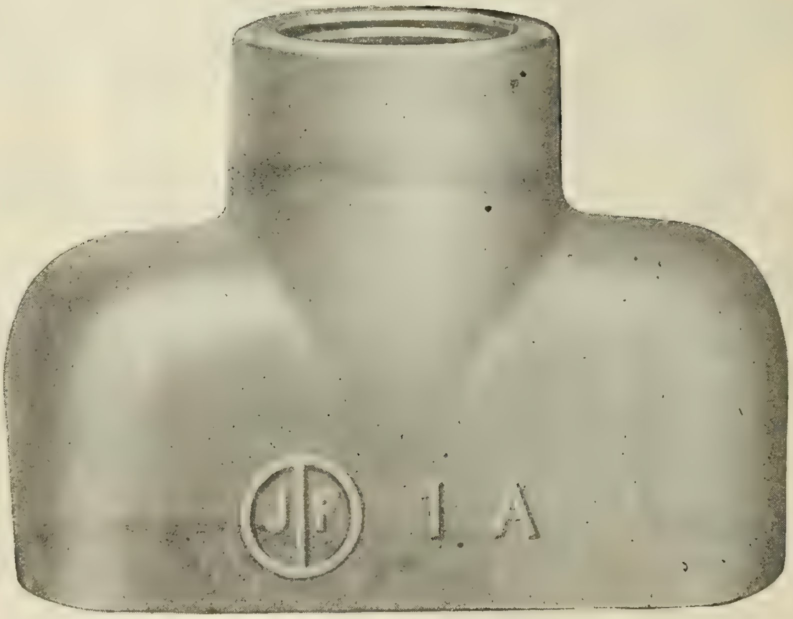

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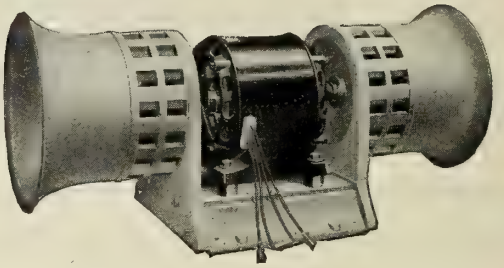

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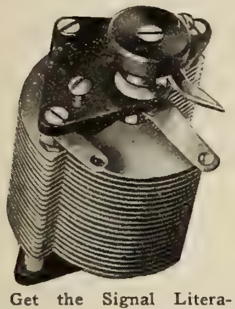

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Winter Joyner Ltd., A. H.

REFLECTORS
National X-Ray Reflector Company
Pittsburgh Reflector & Illuminating Co.

REMOTE CONTROL SWITCHES
Electrical Maintenance & Repairs Company

REPAIRS
Electrical Maintenance & Repairs Company
Electric Motor & Machinery Co., Ltd.
Thomson Company, Fred.
Toronto & Hamilton Elecric Co., Ltd.

RHEOSTAT BOXES AND ACCESSORIES
Canadian Drill & Electric Box Company

ROSETTES
Northern Electric Company

SCREW SHIELDS
Inventions Ltd.
Rawlplug Co., of Canada

SHOWCASE LIGHTING
National X-Ray Reflector Co.

SLATE
Davis Slate & Mfg. Company

SIGNALLING APPARATUS
Macgillivray, G. L. & Co.

SOCKETS
Banfield, W. H. & Sons
McDonald & Willson Ltd.
McGill Mfg. Co.
Northern Electric Company

Electrical
Mechanical
Chemical

Directory of Engineers
and Special Representatives

Testing
Research
Patents

Charles H. Mitchell
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Consulting and Supervising Engineers
Hydraulic, Steam and Electrical Power Plants, Industrial and Municipal Engineering.
Traders Bank Building, Toronto

DeGASPE BEAUBIEN
Consulting Engineer
28 ROYAL INSURANCE BUILDING,
MONTREAL

R. S. KELSCH,
CONSULTING ENGINEER
Steam, Hydraulic, Electric.
Reports, Estimates, Arbitrations.
POWER BUILDING, MONTREAL

ALLEN ENGINEERING CO.
INSPECTION ENGINEERS
Inspection during manufacture. Tests and Reports before shipping of:
Electric Power Apparatus, Wires, Cables, Insulators, Transmission Towers and Hardware, Conduits, etc.
41 King Wm. St., HAMILTON, ONT.

J. M. Robertson, Limited
Consulting Engineers
Mechanical, Electrical, Hydraulic, Steam, Gas
Plans, Specifications, Estimates,
Tests, Reports and Supervision.
625 Coristine Bldg., MONTREAL, Que.

M. A. SAMMETT
Consulting Electrical Engineer
Tests, Reports, Arbitrations
Supervision of Lighting and Power Plants
Telephone Main 6757
505 McGill Bldg.
Montreal, P.Q.

PATENTS
HERBERT J. S. DENNISON
Mechanical Engineer and
Registered Attorney
Expert in Patents, Trade Marks, Designs Copyrights and Infringements. 20 Years' Experience in Patents and Practical Engineering
Kent Building,
Yonge and Richmond Sts., TORONTO

Canadian Water-Powers Agency
(Registered)
CHARLES BRANDEIS, C.E., E.E.
Consulting Engineer
We negotiate sale and purchase of developed and undeveloped water-powers.
Estimates made on power available and costs of development.
390 Phillips Place, MONTREAL
Telephone Uptown 2825.

EARL W. MORPHY
Meter Engineer,
Electrical Contractor
Meters tested and Repaired
Interior wiring a specialty.
92 Gould St.
Toronto.
Soo, Ont.

KERRY & CHACE, Limited
ENGINEERS
President: J. G. G. Kerry
Associates; A. L. Mudge, H. R. McClymont
Hydro Electric & Steam Power Developments, Steam & Electric Railways, Pulp & Paper Mills, Industrial Engineering.
Confederation Life Bldg., TORONTO

B.L. CLARK, GEN. MGR.
H C. CHAPMAN, ASST. MGR.
E F. LONGFELLOW, SEC. TREAS.

CANADA ELECTRIC CO.
Contracting Electrical Engineers
"Work That Counts"
MAIN 1556
175 KING ST. E., TORONTO

PROMPT and EFFICIENT
ELECTRICAL REPAIRS

Give your electrical equipment the attention it deserves.
Our specialties are Re-wind and Motor Repairs A. C. & D. C. also Meter Repairing,

Electric Motor Repair Co.
349 Talbot St., London, Ont.

Electrical Testing
Laboratories

"Electrical, Photometrical and Physical Tests and Inspections".

80th Street and East End Avenue,
New York, N.Y., U.S.A.

PATENTS
Trade Marks and Designs
Procured in all Countries
Special attention given to Patent Litigation
Pamphlets sent free on application

Ridout & Maybee
156 Yonge St. Toronto, Ont.

GEO. L. GUY
Electrical Engineer
Plans, Specifications and Estimates
Reports, Arbitrations and Valuations
Tribune Bldg. WINNIPEG

Save Money by Advertising for your Tenders

Competition will keep bids on your work or supplies down to the minimum figure. An advertisement in the

Tender Department
of the
Contract Record
and
Engineering Review

will put you in touch with the great majority of reliable contractors, and help you get the best firm for the job and the right price for the work.

Use the Contract Record Tender Department for the next job.

CLASSIFIED INDEX TO ADVERTISEMENTS—CONTINUED

SPECIAL HEATING APPLIANCES
National Electric Heating Company

STEEL PLATE WORK
Kennedy, William & Sons
Rough Sales Corporation George C.

STOP LOG WINCHES
Kennedy, William & Sons

STORAGE BATTERIES
Canadian General Electric Co. Ltd.
Canadian National Carbon Co.
Exide Batteries of Canada, Ltd.
Northern Electric Company

STREET LIGHTING FIXTURES
Canadian General Electric Co. Ltd.
Northern Electric Company
Winter Joyner, A. H.

SWITCHBOARD SLATE AND MARBLE
Davis Slate & Mfg. Company

SWITCHES
Banfield, W. H. & Sons
Canadian Drill & Electric Box Company
Canadian Johns-Manville Co.
Canadian Westinghouse Company
Chamberlain & Hookham Meter Company
Devoe Electric Switch Company
Electrical Maintenance & Repairs Company
G. & W. Electric Specialty Company
McDonald & Willson Ltd.
Moloney Electric Company of Canada
Northern Electric Company
Square D Company

SWITCHBOARDS
Canadian General Electric Co. Ltd.
Canadian Johns-Manville Co.
Canadian Westinghouse Company
Devoe Electric Switch Company
Ferranti Meter & Transformer Mfg. Co.
Moloney Electric Company of Canada
Monarch Electric Company
Northern Electric Company

SWITCH GEAR
Ferranti Meter & Transformer Mfg. Co.
Monarch Electric Company

TAPE
Canadian Johns-Manville Co.
Packard Electric Company
Northern Electric Company

TELEPHONE EQUIPMENT AND SUPPLIES
Canadian General Electric Co. Ltd.
Century Telephone Construction Company
Macgillivray, G. L. & Co.
Minnestoa Electric Co.
Northern Electric Company

THRUST BEARINGS
Kennedy, William & Sons
Kingsbury Machine Works

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Canadian General Electric Co. Ltd.
Canadian Westinghouse Company
Equator Manufacturing Company
Hubbell Electric Products
National Electric Heating Company
Northern Electric Company

TOOLS
Klein, Mathias & Son
Northern Electric Company

TOY TRANSFORMERS
Canadian General Electric Co. Ltd.

TRANSFORMERS
Canadian Crocker-Wheeler Company
Canadian Westinghouse Company
Electric Motor & Machinery Co., Ltd.
Ferranti Meter & Transformer Mfg. Co.
Kuhlman Electric Company
Moloney Electric Company of Canada
Monarch Electric Co.
Northern Electric Company
Packard Electric Company

TRANSMISSION TOWERS
TRANSMISSION MATERIAL
Can. Link-Belt Co.
Canadian Bridge Company

TROLLEY GUARDS
Ohio Brass Company

TURBINES
Canadian Westinghouse Company
Boving Hydraulic & Engineering Company
Canadian Allis-Chalmers Company
Kennedy, William & Sons
Smith Company, S. Morgan

UNDERGROUND INSTALLATIONS
Gest, Limited, G. M.
Northern Electric Company
Standard Underground Cable Co., of Canada

VACUUM CLEANERS
Canadian General Electric Co. Ltd.
Hoover Suction Sweeper Co. of Canada
McDonald & Willson Ltd.
Northern Electric Company

VARNISHES
Spielman Agencies, Registered

WASHING MACHINES
Altorfer Bros.
Benson-Wilcox Electric Co.
Canadian General Electric
Earle Electric Limited
Great West Electric Co.
Hurley Machine Company
McDonald & Willson Ltd.
Northern Electric Company
Onward Mfg. Co.

WATER WHEELS
Kennedy, William & Sons
Smith Company, S. Morgan

WIRE
Boston Insulated Wire & Cable Company, Ltd.
McDonald & Willson Ltd.
Northern Electric Company
Phillips Electrical Works, Ltd., Eugene F.
Standard Underground Cable Co., of Canada Ltd.

WIRING DEVICES
Banfield, W. H. & Sons
Canadian General Electric
Northern Electric Company

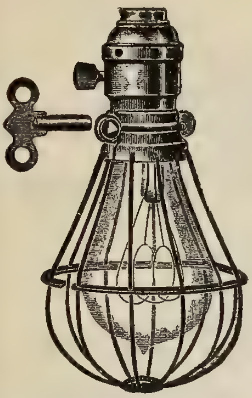
WOOD SCREWS
Robertson Mfg. Company, P. L.

RADIO INSULATORS

- *Excellent Glaze Finish*
- *Packed in Corrugated Cartons*
- *Stands any Test*
- *Glazed all over making Insulation Complete*
- *Immediate Delivery from Stock*

Macaulay Pope **186 Bay Street, Toronto**
Ade. 5318

Montreal Agents: GEO. C. ROUGH SALES CORPORATION, 134 Coristine Bldg.



Safeguarding the Lamp

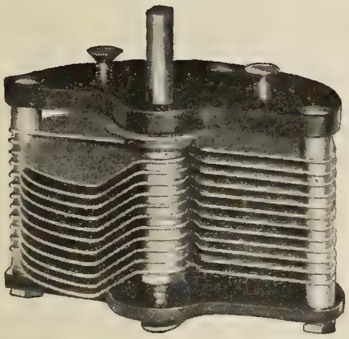
From Theft or Breakage

LOXON Does It!

One turn of the key and the lamp can't come out. Loxon, the lamp guard, is popular all over America. It sells at a single price at a single glance.

Many other electrical specialties which will make money for you. Get in touch with us. Illustrated price lists free.

McGILL MANUFACTURING COMPANY, Valparaiso, Ind.



Variable Condensers

Variable condensers to be efficient must be well made. Loose joints or faulty construction soon allows the plates to get out of alignment and decreases their efficiency.

A seasoned organization backed by a half million dollar equipment have placed the United Condensers in the front rank with radio engineers the country over.

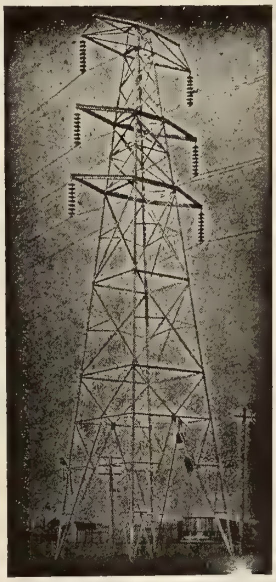
Prices	43 Plate	$4.50
	23 "	4.30
	11 "	4.00

without dial or knob.

Liberal discounts to jobbers and dealers.
We invite correspondence with Radio Manufacturers who are interested in using our facilities and services for manufacturing Radio Equipment.

United Mfg. and Distributing Co.
536 Lake Shore Drive, Chicago, Ill.

GALVANIZED STEEL
TOWERS AND POLES



Standard Tower of the Hydro Electric Power Commission of Ontario

The modern means of supporting overhead wires.

Power
Telephone
and
Trolley
Lines

We shall be pleased to furnish designs and estimates upon request.

The Canadian Bridge Co., Limited
Walkerville, Ontario, Canada
Structural Steel of all Kinds
Montreal Office in New Birks Building.

The Cleveland Fare Box

There are 8 different Models of Fare Boxes, which cover the fare collection field from the smallest to the largest car, accommodating any rate of cash fare, and any kind of ticket.

Write us for explanation

CANADIAN CLEVELAND FARE BOX COMPANY
Limited
PRESTON ONTARIO

L. C. Barbeau & Co., Ltd.

Wholesale

Electrical and Automobile accessories

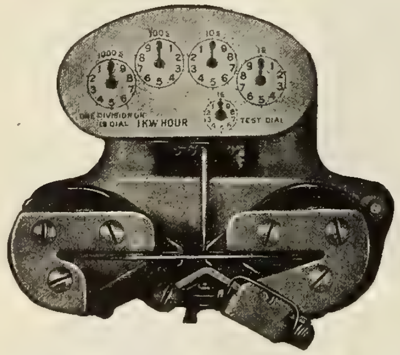
Lamps of all kinds.

Ask for our weekly price list.

320 St. James St. - Montreal

Use Westinghouse Type CC Watthour Meters To Serve as Cash Registers on Your System

Type C C Watthour Meter with Glass Cover



Type C C Watthour Meter
Meter Element removed from case

They are pre-eminently adapted to give the maximum possible accuracy, embodying as they do the following distinctive features:

Slow-speed worm, reducing friction, and jewelled bearing in sub-gear train.

Double-jewelled ball bearings in main shaft, giving unequalled sustained accuracy.

One-piece electro-magnet accurately proportioned, and safeguarded against change.

Permanent magnet system, generous in the use of material, carefully treated, correct in design.

The meter element can be removed as a unit, without disturbing the calibration.

Canadian Westinghouse Co., Limited, Hamilton, Ont.

TORONTO, Bank of Hamilton Bldg.
HALIFAX, 105 Hollis St.
CALGARY, Canada Life Bldg.

MONTREAL, 285 Beave. Hall Hill
FT. WILLIAM, Cuthbertson Block
VANCOUVER, Bank of Nova Scotia Bldg.

OTTAWA, Ahearn & Soper, Ltd.
WINNIPEG, 158 Portage Ave. E.
EDMONTON, 211 McLeod Bldg.

REPAIR SHOPS:

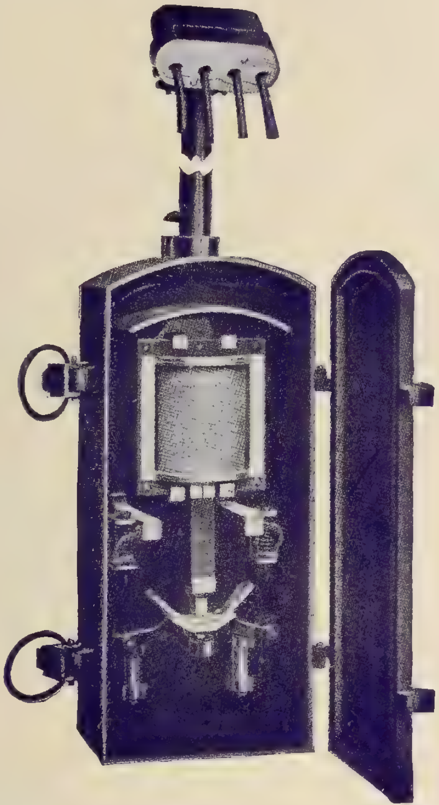
MONTREAL—113 Dagenais St.
TORONTO—366 Adelaide St. W.

VANCOUVER
1090 Mainland St.

WINNIPEG—158 Portage Ave. E.
CALGARY—316 3rd. Ave. E.

CANADIAN WESTINGHOUSE

Westinghouse



Cap. 30 Amp

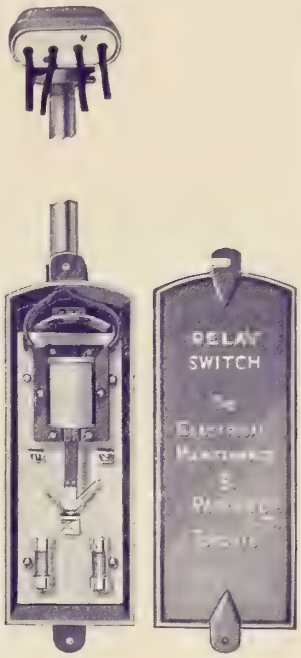
Engineers, Take Notice!

A new, smaller, simplified Remote Control Switch.

A young friend of our 30 Amp Switch—to do the many small jobs where the big fellow is too expensive.

Cheaper, yet perfectly dependable. Has been tested equal to five years' service.

For Street Lighting Control. Write about this.



Cap. 15 Amp

The Electrical Maintenance & Repairs
Company, Limited
162 Adelaide Street West Toronto

XCELADUCT

Approved by the Hydro-Electric Commission of Ontario
Labelled under supervision of Underwriters' Laboratories

GALVANIZED

Made in Canada Conduit

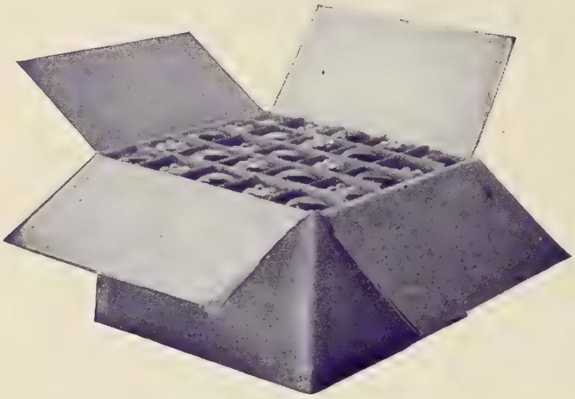
Electrical Wiring Made Safe

For All Electrical Installations

Manufactured by
National Conduit Co., Limited
Toronto

Sales Agents for Manitoba and Saskatchewan—Filer-Smith Machinery Co., Limited, Winnipeg.

White's Porcelain Strain Insulators



STANDARD CARTON

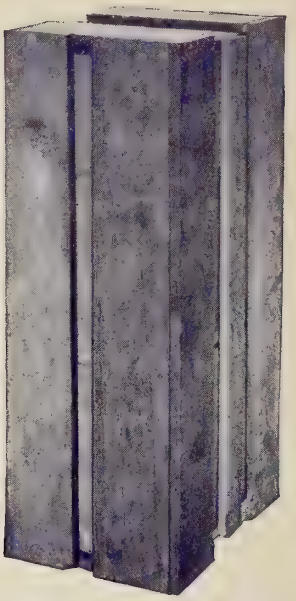
We are now packing our insulators in cartons.

No mussy sawdust.

No breaking.

Easily counted.

Easier handled and stocked.



STANDARD PACKAGE

Try some of our insulators—They all have a very uniform brown glaze, a very distinctive color, no black spots or discoloration.

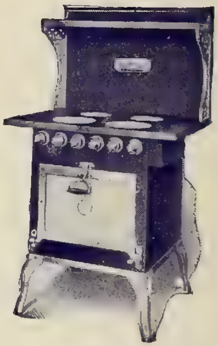
T. C. WHITE ELECTRICAL SUPPLY COMPANY

1122 PINE STREET, ST. LOUIS, MO.

National
ELECTRIC

Ranges, Water Heaters and Hot Plates

C6
C-6 Range



A-4 Range

Show these Appliances in your Store and be prepared to meet the demand

Water Heater

Two Burner Hot Plate

The National Electric Heating Co., Limited, Toronto

MONTREAL
49 Mountain Street

WINNIPEG
52 Albert Street

VANCOUVER, B.C.
1001 Standard Bank Bldg.

Vol. XXXI No. 15 Toronto, August 1, 1922

Electrical News

Engineering
Contracting

Merchandising
Transportation

You Can Now Offer Your Customers

Adjusto-Lite

A FARBERWARE PRODUCT

Reg. Can. Pat. Off.

TRADE MARK

RETAIL PRICE NOW

$5

West of the Rockies and in Maritime Provinces 25c additional.

"The Lamp With the Clamp"

Constructed in Canada

Adjusto-Lite — unique, practical and substantial, is indispensable in home, office, store and studio—in fact, everywhere good light is needed. That's why Adjusto-Lite is so popular—that's why it enjoys such a wide sale throughout the Dominion.

At the $5 retail price Adjusto-Lite is a ready seller and **gives you a good profit.** The 12-months' advertising campaign in McLean's, the Canadian Home Journal and Toronto Saturday Night means sales for you.

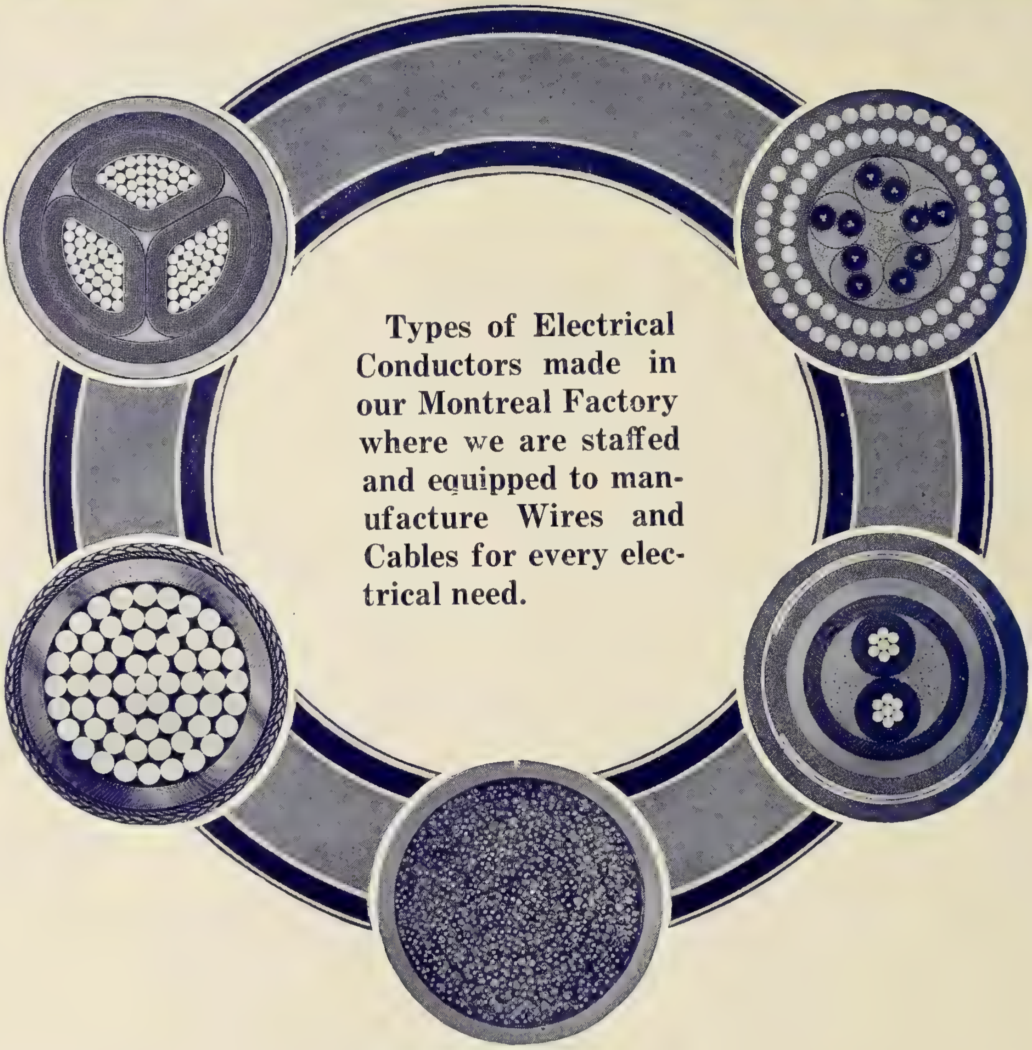
Adjusto-Lite comes packed in an attractive carton which helps sales materially. Put in a window display and watch your sales grow. Your jobber can supply you. ***Write for prices.*** Shipments F.O.B. Brantford, Ont.

S. W. FARBER, Inventor

141-151 South 5th Street - Brooklyn, N. Y.

Alphabetical Index to Advertisers, Page 10 Classified Directory to Advertisements, Page 68

ELECTRICAL CONDUCTORS
TELEPHONE TELEGRAPH AND POWER CABLES



Paper Insulated Sector L.C. Power Cable

Submarine Telephone Cable

Types of Electrical Conductors made in our Montreal Factory where we are staffed and equipped to manufacture Wires and Cables for every electrical need.

Varnished Fabric Taped and Braided Power Cable

Paper Insulated Armored Power Cable

Paper Insulated L. C. Telephone Cable

Northern Electric Company
LIMITED

MONTREAL	TORONTO	WINDSOR	CALGARY
HALIFAX	HAMILTON	WINNIPEG	EDMONTON
QUEBEC	LONDON	REGINA	VANCOUVER

"Makers of the Nation's Telephones"

MANUFACTURING
- Manual Telephones
- Automatic Telephones
- Wires & Cables
- Fire Alarm Systems
- Radio Sending and receiving Equipment

DISTRIBUTING
- Construction Material
- Illuminating Material
- Power Apparatus
- Household Appliances
- Electrical Supplies
- Power & Light Plants
- Marine Fittings

A Three Hundred Thousand Dollar Trainload of A B C Electric Washers!

Sets a New World's Record. Another Example of A B C Popularity Everywhere

The unrivaled values offered by the latest model A B C Electric Washers have captured the continent! Dealers are breaking all records in many localities, both in Canada and the States. They report that the A B C is the best selling line of washers on the market.

As a result, A B C's are not only being ordered by carloads, but by solid trainloads, too!

Consisting of 35 cars loaded with considerably more than 2,000 A B C's—three hundred thousand dollars' worth—the latest trainload left Peoria on July 1st. *This was the largest shipment of washers ever made in the entire history of the industry.*

It went to A. A. (Washer) Wilson of Los Angeles. For years he has retailed and distributed the A B C Line in Southern California. Mr. Wilson operates eight retail stores himself.

A short time previous, another trainload was shipped to the Morton Electric Company, retailers and distributors of A B C's at St. Louis, Mo.

These trainload shipments clearly indicate what veterans in the business think of the A B C.

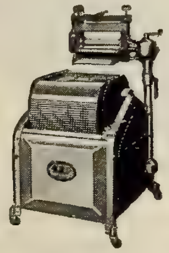
And the A B C is meriting such faith. Just recently, to cite one example, 706 A B C's were sold in thirty days at Philadelphia, by a single dealer.

If you want to get into the washing machine business *right*, investigate the A B C Line.

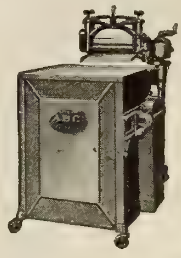
It includes the three popular types—dolly, oscillating and reversing cylinder. The price range, $72 to $200, provides a washer for every prospect's purse. It is a line upon which to concentrate.

Get our proposition at once. You can bank on it as a winner! Liberal profits. Real co-operation. Wire or write today.

A B C "Alco" (dolly-type) Washers. Single and double tub. Power and electric.
$72 to $138



A B C Oscillator, full 6-sheet size, heavy copper tub. Greatest value ever offered in an electric oscillator.
$135



A B C Super Electric Washers, full cabinet models, are the finest washers on the market.
$170, $200

All prices quoted are retail, except in B. C. and the Maritimes

ALTORFER BROS. COMPANY, Peoria, Illinois
Pioneer and Leading Makers of Washers and Ironers

C. D. Henderson, *Canadian Representative*, Box No. 123, Brantford, Ont.

Wholesale Distributors

MARITIME PROVINCES
Blackadar & Stevens, Roy Building, Halifax, N. S.

ALBERTA
Cunningham Electric Co., Ltd., Calgary

SASKATCHEWAN
Sun Electrical Supply, Ltd., Regina

ONTARIO
Masco Co., Ltd., 78 Richmond St., Toronto

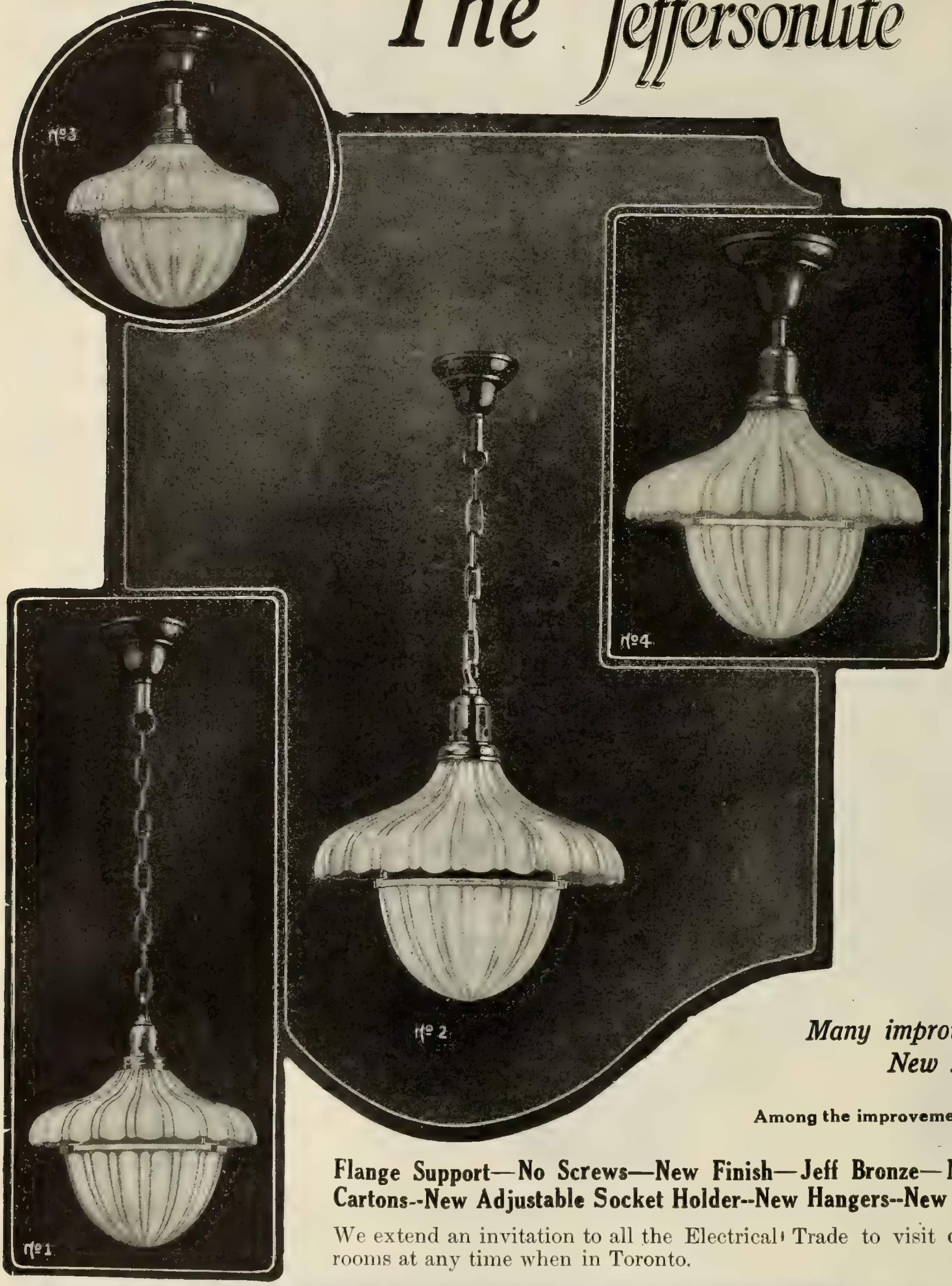
QUEBEC
Dawson & Co. Ltd., 128 Bleury St., Montreal

CORRECTION!

This is the advertisement which should have appeared on page 9 of the July 15th issue, instead of the one which did run, as explained on page 49 of this issue.

MADE IN CANADA

The "Jeffersonlite"



Many improvements feature the New Jeffersonlite

Among the improvements are—

Flange Support—No Screws—New Finish—Jeff Bronze—New Bowl—Individual Cartons--New Adjustable Socket Holder--New Hangers--New Package--New Prices.

We extend an invitation to all the Electrical Trade to visit our Bay Street Showrooms at any time when in Toronto.

FACTORY & HEAD OFFICE
388 CARLAW AVE
TORONTO

DOWN-TOWN SHOW ROOMS
164 BAY ST. TORONTO

Jefferson
MADE IN CANADA
Glass
COMPANY LIMITED

285 BEAVER HALL HILL
MONTREAL
272 MAIN STREET
WINNIPEG
510 HASTINGS ST. W.
VANCOUVER

Safety Ribbons

Strong tapes that stay sticky

A WIREMAN can go the limit on a fussy splice, but when it's all done, no splice is better than the tape it's wrapped with.

And with the best tape so reasonable in price, no wonder there's a constantly growing demand for Johns-Manville guaranteed Tapes and Splicing Compounds.

Outdoors or inside; on the splice or in the tool kit, Johns-Manville Tapes and Splicing Compounds stay strong and sticky and retain their high insulating efficiency.

Johns-Manville Friction Tapes and Splicing Compounds are carried in stock by all Johns-Manville Distributors.

CANADIAN JOHNS-MANVILLE CO. LIMITED
Toronto Montreal Winnipeg Vancouver Windsor Ottawa

Buy Good Tape

Johns-Manville Jomanco Friction Tape for general outdoor work; Johns-Manville No. 3 Friction Tape for motor leads and switchboards; Johns-Manville No. 5 Friction Tape for inside work; Johns-Manville Armature Tape for Coils.

Johns-Manville Alpha Splicing Compound for extra strength and puncture resistance. Johns-Manville Brooklyn Splicing Compound for low voltage work.

JOHNS-MANVILLE SERVICE
COVERS THIS CONTINENT
Through
ASBESTOS
and its allied products
Electrical Materials
Brake Linings
Insulations
Roofings
Packings
Cements
Fire Prevention Products

JOHNS-MANVILLE
ELECTRICAL MATERIALS

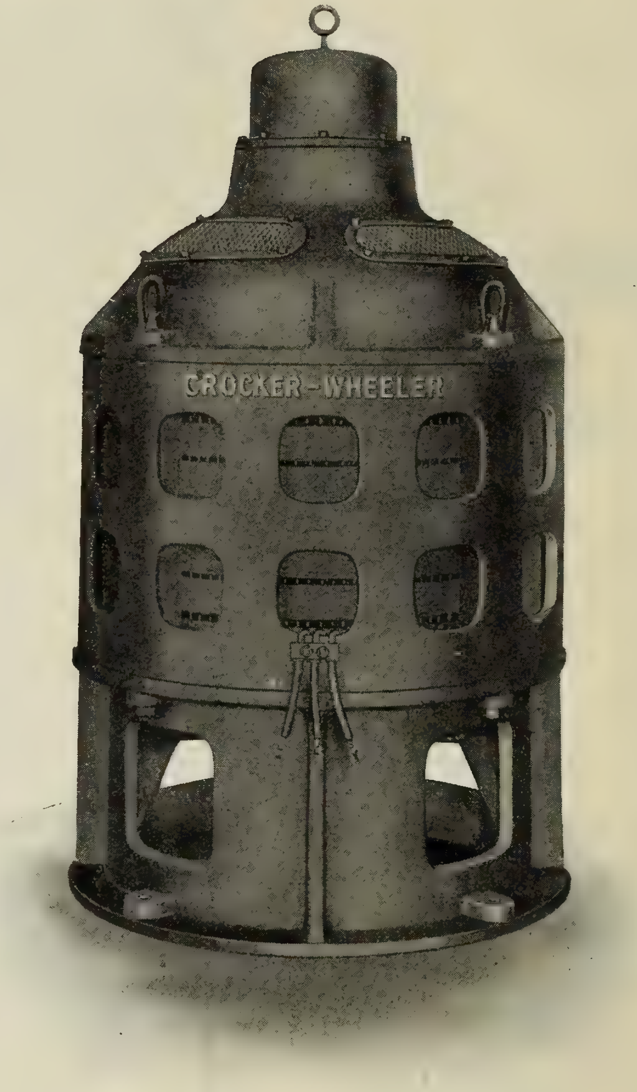
Vertical Motors

Electric motors for any duty that will serve Industry—built with the instinct of the pioneer who meets difficulties only to conquer them—

That describes Canadian Crocker-Wheeler motors.

This vertical Pump Motor is built for exacting service.

Our cast welded motor construction gives unusual life to the working part of the motor. Form wound coils, ample bearing capacity, complete ventilation, accessibility to bearings, extra size journals and shaft ensure complete satisfaction with this motor.



Vertical pump motor—350 h.p., 720 h.p., in 2200 volts, 3 phase, 60 cycle

THE CANADIAN
CROCKER-WHEELER CO.
LIMITED

Manufacturers and Electrical Engineers

Head Office and Works:
ST. CATHARINES. Ont.

District Offices:
TORONTO MONTREAL

Also all
Branches of
Northern Electric Company
LIMITED
Montreal, Halifax, Ottawa,
Toronto, London, Winnipeg,
Regina, Calgary, Vancouver.

Diamond Fibre—

"Condensite
Celoron"
for
waterproof
insulation

"the sum total of all the best qualities of other insulating materials with none of their deficiencies"

Glass, porcelain, rubber, mica, etc., each have peculiar insulation qualities which make them adaptable for particular uses. Diamond Fibre in its various grades possesses the composite best qualities of all other insulation, besides additional features which give it a distinct superiority.

The character of this material enables us to supply it in the most convenient forms for cutting, stamping or machining.

Give us an opportunity to demonstrate why Diamond Fibre is a better material for your particular requirements.

Diamond-F

Diamond State Fibre Company

of Canada Limited
Head Office and Works: 235 Carlaw Ave., Toronto, Can.

Smith Hydraulic Turbines

Have Justified Their Installation in many of America's Biggest and Best

Hydro Electric Developments

The accompanying view illustrates a SMITH RUNNER, 13 feet diameter, made in one continuous casting by means of dry sand cores.

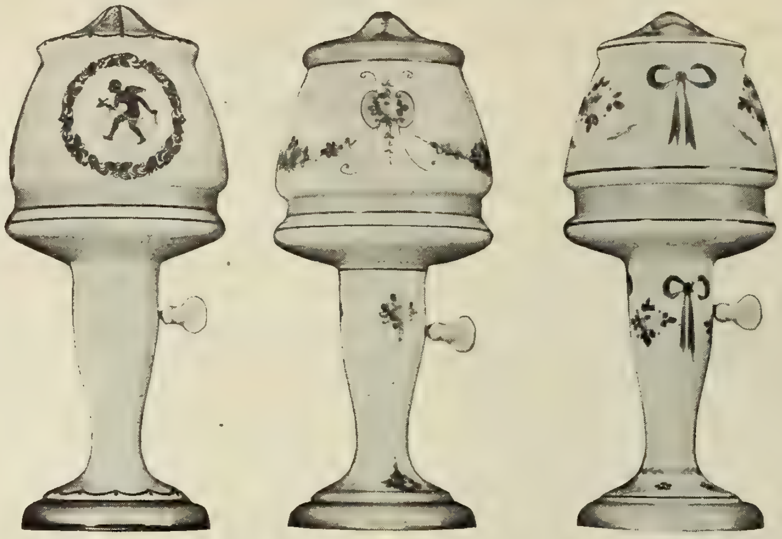
THREE TURBINE UNITS (of which these runners comprise the rotating element) furnished for installation in the Yadkin Falls, N. C., plant of the Aluminum Co. of America. Each unit develops 10,000 H.P. at 90 R.P.M. under 48 feet head, using water at 92 per cent efficiency.

Write Dept. "N" for Bulletin.

S. MORGAN SMITH CO.
YORK, Pa., U.S.A.
H. B. VANEVERY, Representative
405 Power Building Montreal

Imported Electric Boudoir Lamps

BOHEMIAN DECORATED GLASS



An entirely new line of very attractive Electric Boudoir Lamps.

A close-fitting shade on a one-piece stand, both of white glass, hand-decorated in six different floral and semi-conventional patterns, entire height 11 inches, complete with 6 ft. of cord and attachment plug.

Trade Price.....................Each $4.50

Illustration shows one of many new items in Electric Lighting Goods appearing in our new

ELECTRICAL CATALOGUE

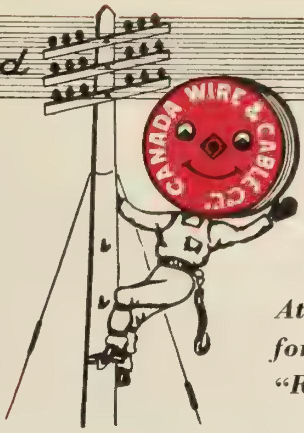
(Ready August First)

Electric Fixtures, - Commercial Lighting Fixtures
Portable Lamps - Imported Electrical Glassware
Fixture Parts and Sundries

NERLICH & CO.

146-148 Front St. West, Toronto

Canada Wire & Cable Co. Limited


CANADA WIRE & CABLE CO.

Halifax Montreal Toronto Regina
Winnipeg Calgary Vancouver

Electric Wires and Cables

Copper
Bare, Weatherproof, Rubber Covered
Steel Wire Rope

At the top
for
"Reel Service"

Table Lamps of all kinds

Write for catalogue

See our $4.00 Special in Table Lamps

Special in Imported Electric Shades
Four Patterns

Packed twenty four dozen to case Per Doz. $1.50
Less than case lots - - - Per Doz. $1.80
(No charge for original cases)

LYONS & MARKS

38 Yonge Street **Toronto, Ontario**

AICO

COLD MOLDED INSULATION
BAKELITE - CONDENSITE - ROXITE
SHELLAC COMPOSITIONS

We have a capable engineering force ready to take up your molded insulation problems.

Suggestions and estimates cheerfully given without obligation.

AMERICAN INSULATOR CORPORATION
New Freedom, Pa., U. S. A.

Represented in Canada by
G. L. MacGILLIVRAY & CO., LIMITED
35 St. Nicholas St., Montreal, P.Q.

AMPLIFY YOUR RADIO SIGNALS WITH

SUPER-SENSITIVE
Detectagraph
MICROPHONE DEVICES

Practical Instruments for Commercial & Scientific Purposes
Super-Sensitive Detectagraph Transmitter No. 2, Price $8.00 complete.

Adjusted Model No. 60 Horn, High Grade Loud Talking Receiver, Cord Plugs and Desk Stand Base, Price $15.00 complete.

Our New Special Loud Talking Receiver No. 25, Price $7.50.

Detectagraph Rheostat, especially made for amplifying circuits, Price $2.00 complete.

Write for our free descriptive new catalogue showing our complete Super-Sensitive Hearing and Talking Devices.

C. BOISSONNAULT COMPANY (Inc)
25 Church St. Factory: Whitestone, L. I. New York City

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Rubber Covered Wires and Cables

FOR POWER, LIGHT AND TELEPHONE WORK

Incandescent Lamp Cord, Flexible Switchboard Cables, Special Cords and Cables for all kinds of Electrical Work.

Prompt Shipments from Canadian Factory.

BOSTON INSULATED WIRE & CABLE CO., Limited

Canadian Office and Factory, HAMILTON, ONT.

A Galvaduct Building—Y. M. C. A. at Kitchener, Ont.
Electrical Contractors—The Star Electric Co., Kitchener, Ont.

GALVADUCT

"GALVADUCT"

The most perfect interior construction conduit on the market. Recognized as the standard of high quality.

Always specify Galvaduct or Loricated CONDUITS

"LORICATED"

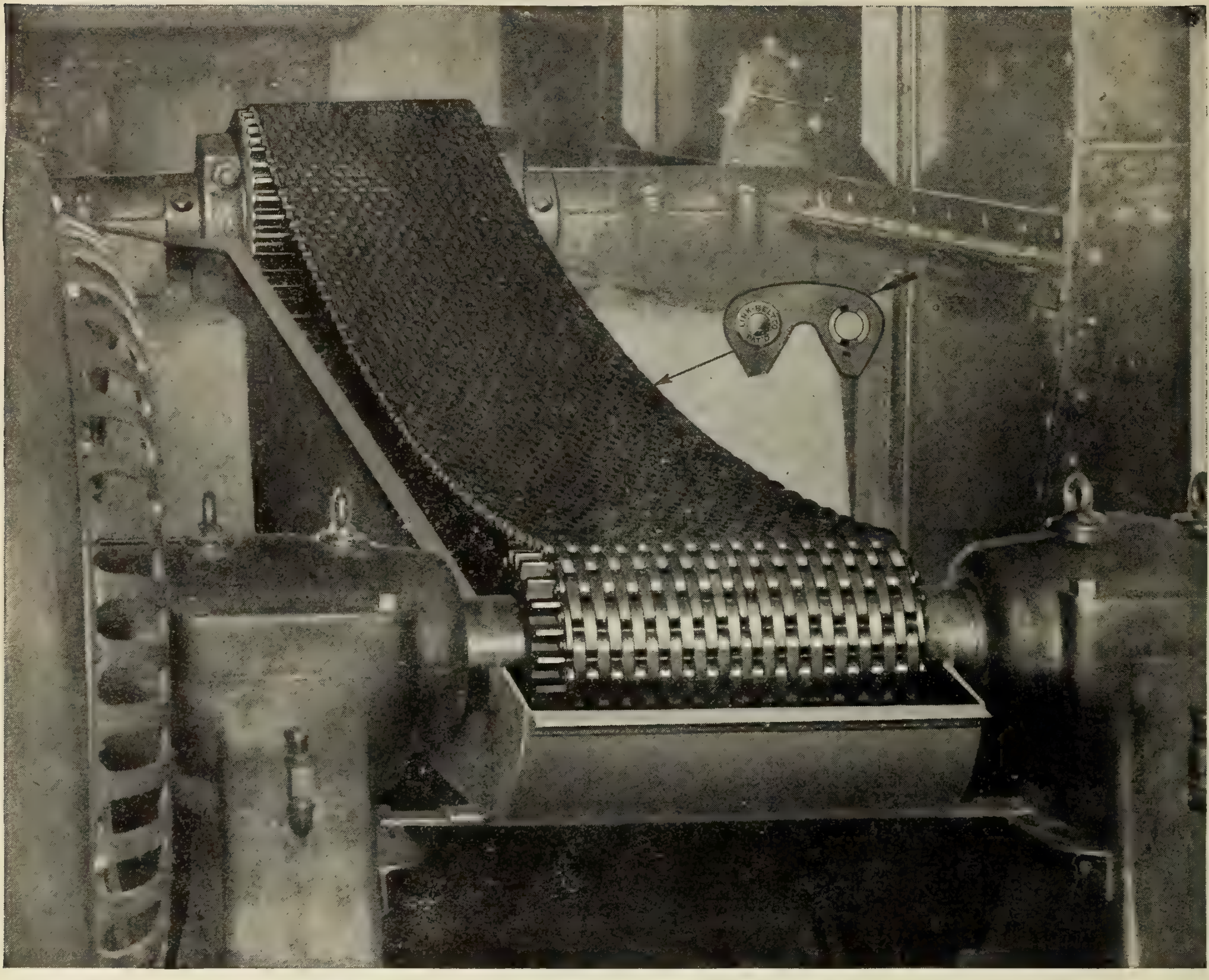
A high-class interior construction conduit of the enameled type, proof against acid or other corrosive agents.

If your jobber cannot supply you—write us.

CONDUITS COMPANY LIMITED
TORONTO MONTREAL

Western Sales Office: 602 Avenue Building, Winnipeg

LORICATED



TWO SHAFTS THAT REVOLVE AS ONE

Flexible as a Belt—
Positive as a Gear—
More Efficient than Either.

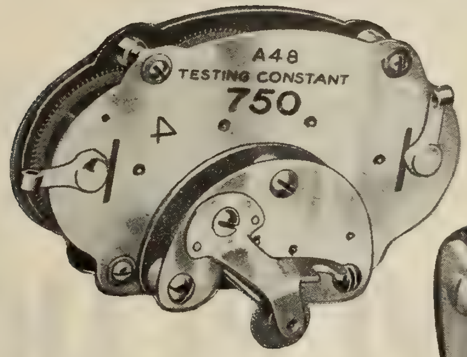
A Link-Belt Silent Chain Drive is the most positive mode of power transmission yet devised. The driving and driven shafts must revolve as one. For there is no slippage as with belts—no "play" as with gears. And there is no loss of power—no loss of time due to broken belts or gear teeth.

Chain your power to your driven machine. It's the most economical, positive and efficient method of power transmission. Our 128 page data book No. 125 tells why. Send for a copy. Ask our engineers to help you solve your power transmission problems.

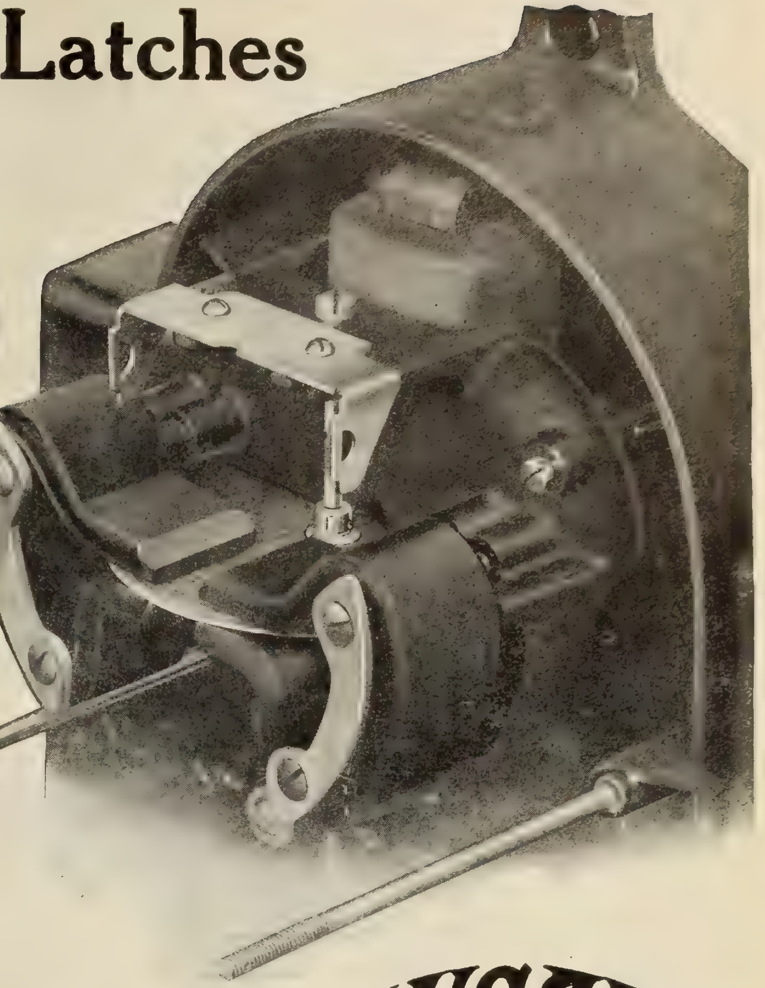
CANADIAN LINK BELT COMPANY LTD.
TORONTO, WELLINGTON & PETER STS. MONTREAL, 10 ST MICHAELS' LANE

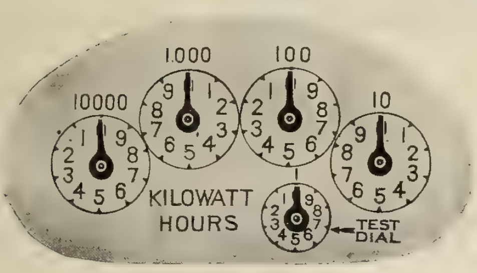
LINK-BELT

Just Snap on the Latches



Back view of Recording Train of Sangamo Type "H" A.C. Watthour Meter. Note the two little **latches** which snap into place, thereby holding the train and dial to the supporting bracket (right). This bracket is held to the Main Grid by two screws and need not be removed.





Dial of Type "H" A.C. Watthour Meter

The New Method of Attaching the Recording Train of

SANGAMO

Sangamo Type "H" Meters

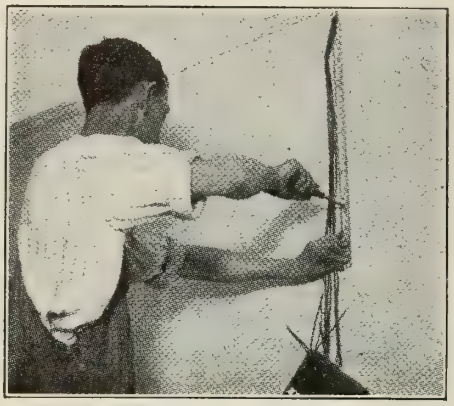
This refinement in Sangamo Meter design means that instead of having to unfasten two screws in order to remove the Recording Train for inspection, it is necessary only to **snap two latches.** The entire train comes away from the Supporting Bracket, leaving the bracket itself firmly screwed to the Main Grid. To refasten the Train to the Bracket, simply snap the latches back again. Simplicity itself—typical of Sangamo Type "H" Construction throughout.

Send for Bulletin 55-C describing in full these A.C. Watthour Meters.

Sangamo Electric Company
of Canada, Limited

Factory: TORONTO **Head Sales Office:** MONTREAL

2000



"Fix it with Rawlplugs"

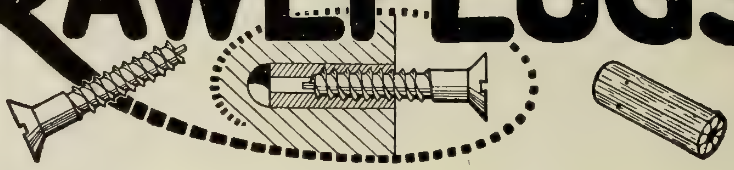
TO the electrician Rawlplugs are invaluable for fixing any kind of electric wires, cables, pipes, brackets or anything that is held by a screw.

Using Rawlplugs is equivalent to tapping every hole made as a perfect thread is formed as the screw is turned home. Devices when fastened in this way never pull out, or work loose because Rawlplugs absorb and resist vibrations and strains.

Used, and endorsed by leading electrical contractor-dealers everywhere.

Anything that is held by a screw is held longer and stronger by using Rawlplugs.

RAWLPLUGS



INVENTIONS LIMITED

Sole Agents for the Rawlplug Co. of Canada

Southam Building Bleury Street Montreal

Sales Agents for Ontario:
Dominion Engineering Agency, Limited, 24 Adelaide St., East, Toronto

The Rawlplug Company, 461 Eighth Ave., New York City.

MOLONEY TRANSFORMERS

RELIABLE AND EFFICIENT

Reliability under the severest conditions has always been one of the most desirable features of MOLONEY Transformers. That they are also efficient and give long service is proved by their ever increasing use from coast to coast. Let us send you full particulars.

MADE IN CANADA

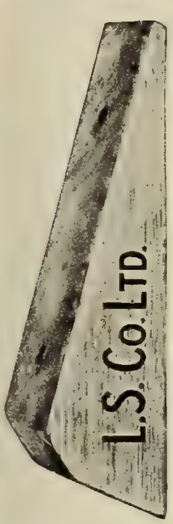
MOLONEY ELECTRIC COMPANY OF CANADA, LIMITED

Agents:
Frank Darling & Co., Ltd., Vancouver. General Supplies Ltd., Calgary.

District Offices
Montreal, Halifax
and Winnipeg

Factory
Windsor, Ont.

Head Sales Office
501 York Bldg., King & York Sts.,
Toronto



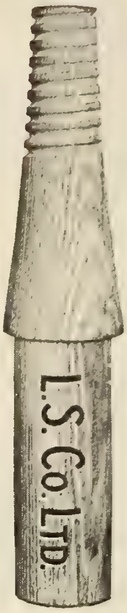
We are manufacturers, in a large way, of

TOP PINS, SIDE BRACKETS, POLE STEPS AND CROSS ARMS

We have been supplying this pole line material for years, from coast to coast, to the largest telephone, telegraph and electric lighting systems.

Our goods are specified where efficiency and economy are measured by actual results and not by purchase price only.

THE LACHUTE SHUTTLE CO., LIMITED
Lachute Mills, P. Q.



Service to the Dealer

It is our aim to give the dealer and contractor the greatest service it is in our power to give irrespective of the size of the order.

At our warehouse we carry in stock a complete range of electrical supplies, ready to be shipped at a moment's notice. Each order is carefully packed and every precaution taken to insure safe and prompt delivery.

Our prices at all times are according to the prevailing market.

Full details of any of our lines gladly furnished on request.

Great West Electric Co. Ltd.
Winnipeg, Man. **Calgary, Alta.**

TRICABLE

Armoured Conductors

Made in Canada

Most Flexible Armoured Cable on the market. Bends on a 2 inch Radius.

Safety

Service

Satisfaction

Stocked by all jobbers.

Selling Agents

Conduits Company Limited

33 Labatt Avenue TORONTO

Packard

Transformer Temperature Signal

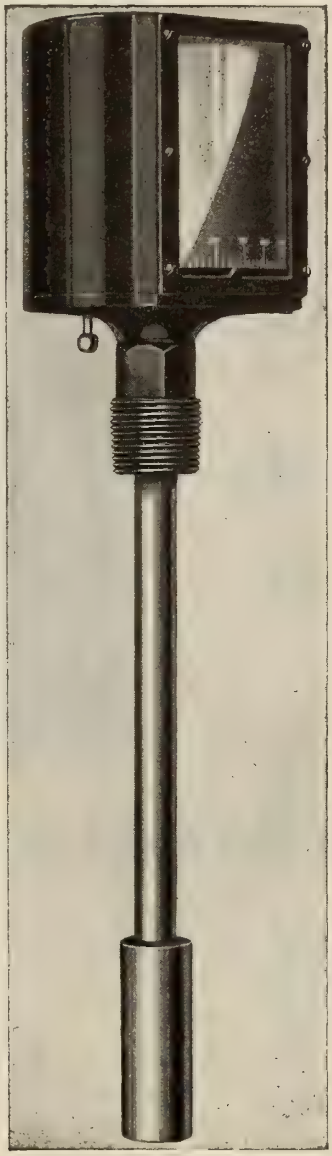
For Every Service Type Transformer

A Maximum Demand Heat Meter

All station Transformers, Circuit Breakers and all Machinery that is liable to reach a dangerous temperature by overload or any other condition should be equipped with one.

Canadian and U. S. Patents Pending

See Our Nearest Representative



White Signal Shows Dangerous Temperature

Can be seen and read from the street or from the floor when used on large apparatus.

Simple, durable and easily installed.

Others may follow but we lead

The Packard Electric Co., Limited

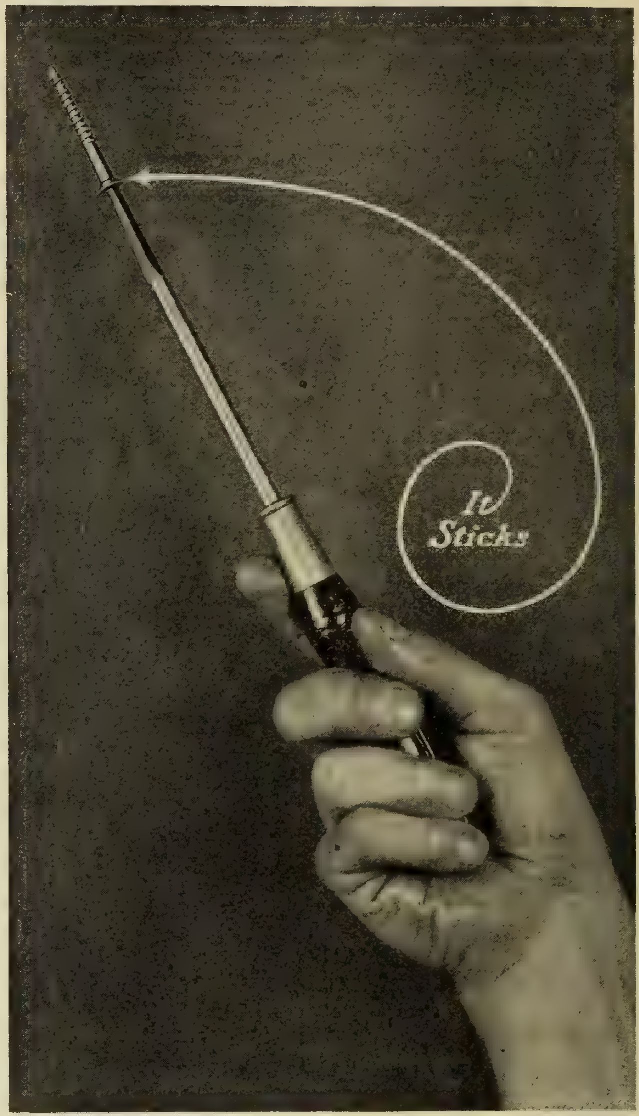
St. Catharines, Ontario

Room 308-9, 7 Adelaide St. W., Toronto
421 Power Building, Montreal
703 Confederation Life Building, Winnipeg

Agents:

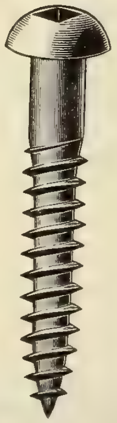
Eastern Electric Co., Limited, St. John, N.B.
J. T. Warren, 738-11th St. West, Calgary, Alta.
W. H. Hazlitt & Co., Ltd., Room 401 Northwest Bldg., Vancouver, B. C.
John Starr, Son & Co., Limited, Halifax, N.S.

Your Best Friend in a Tight Place



Besides speeding up the work in general you will find the socket head screw an ever present help in driving in awkward spots. Simply slip the screw on the driver and you can operate at arm's length and at all angles, using a single hand.

Doubles Screw Driving Efficiency


Pat'd Feb. 2, 1909

As practically no pressure is required to keep the screw driver in place, all the energy can be used in turning the screw. The driver does not slip, wabble or wear the screw. The socket head positively eliminates all disfigurement of both screw and woodwork.

Contractors on every hand speak in glowing terms of the socket head screw and its use is steadily growing among the most progressive electrical men.

ONE USER WRITES US—"In the last 15 years I have burnt a million matches hunting for the confounded slots—but a blind man can drive the Socket Screw."

A Trial Will Settle It

P. L. Robertson Mfg. Co. Ltd.
Milton, Ontario

Once Introduce a Reliable Electrical Appliance Into a Home, and it is a Certain Forerunner of Others

The Premier
ELECTRIC CLEANER

PREMIER Cleaners sell more readily, because their reputation is firmly established. Several hundred thousand Premier Cleaners are in use every day and are giving absolute satisfaction. They are tested for service.

Deferred Payment Plan

It goes without saying, that a dealer's ability to offer his customers the so called "easy payment" plan in the purchase of Premier Electric Cleaners, will materially stimulate his sales.

We have recently made arrangements, that will enable you to sell Premier Cleaners on the Deferred Payment Plan. There's no "red tape" about this proposition. The objectionable features of other similar plans have been eliminated. The dealer is now able to make a profit on sales, by the instalment plan, in excess of those made on sales to customers for immediate cash.

Further particulars, regarding the sale of Premier Cleaners on the Deferred Payment Plan, can be supplied to you by our nearest sales branch. Write and ask them to tell you all about it.

"Made in Canada"

Canadian General Electric Co., Limited

HEAD OFFICE TORONTO

Branch Offices: Halifax, Sydney, St. John, Montreal, Quebec, Cobalt, Ottawa, Hamilton, London, Windsor, South Porcupine, Winnipeg, Calgary, Edmonton, Vancouver, Nelson and Victoria.

Important To The

Hotpoint

THE Management of the Canadian Edison Appliance Co., Limited, wish to announce, that on and after August 1st, the sale of Hotpoint merchandise will be handled as a Division of the Canadian General Electric Co., Limited, Head Office, Toronto, who have acquired complete control of this Company.

Selling Policy

The present selling policy of this Company will be maintained under the new Management. Distribution of Hotpoint merchandise will continue through the present existing channels, and every effort will be made to provide both jobbers and dealers with increased co-operation, in the merchandising of Hotpoint Electrical Devices.

A well balanced sales organization of Hotpoint specialists will be maintained throughout the Dominion, and our customers will therefore, receive the best possible service and assistance.

Canadian Edison Appliance Co., Limited
STRATFORD, ONTARIO.

Notice
Trade

Hotpoint

The new arrangement will mean, that in the immediate future, every C.G.E. Sales Branch will be in a position to make prompt shipments of Hotpoint appliances. We would, therefore, request that those of our customers who have been in the habit of sending their orders direct to Stratford, should in the future, forward them to their nearest C.G.E. Sales Branch. To those of our customers, who have in the past purchased their Hotpoint supplies from any one of our jobber distributors, we would suggest, that they carry on, under their present arrangements.

Advertising Policy

The National Advertising, as inaugurated at the beginning of the year, will be maintained, and arrangements are already under way to materially increase our consumer publicity.

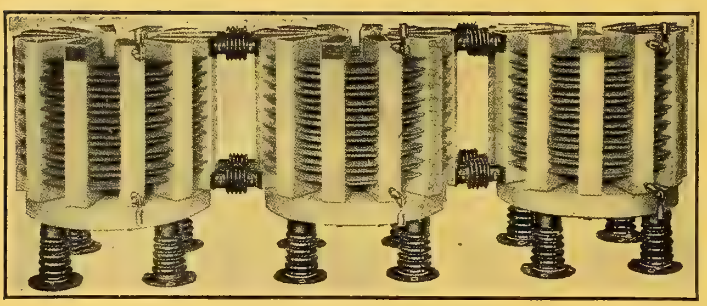
Customers will be supplied with even more selling helps than in the past. Particular attention will be paid to the requirements of individual dealers, who are campaigning Hotpoint appliances.

We wish to take this opportunity of expressing our appreciation to our many customers, who have so generously co-operated with us in making "Hotpoint Servants for the Home" the unquestionable leaders in their respective fields.

Canadian Edison Appliance Co., Limited
STRATFORD, ONTARIO.

Protection is the Best Insurance

Short Circuit Protection

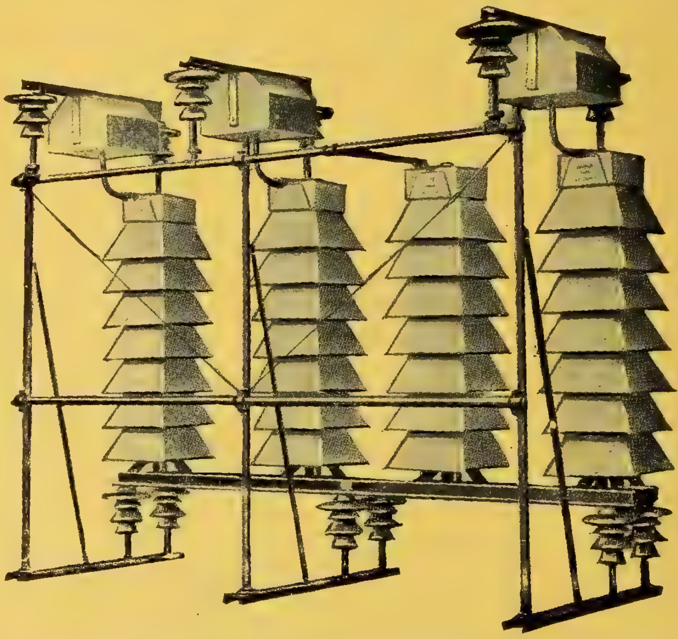


CURRENT LIMITING REACTORS.

IF your system has outgrown the apparatus used for protecting the service against short circuits and other similar troubles, let us help you to find the best solution of the difficulty. It may be best to replace the oil circuit breakers with new ones that will take care of the worst conditions as regards rupturing capacity, magnetic stresses and instantaneous heating of contacts and joints or it may be best to limit the conditions by using current limiting reactors. The "Cast in Concrete" Reactor is superior to all other types in ability to withstand mechanical and electrical stresses and is not injured by severe rises in temperature.

Lightning Protection

The Canadian General Electric Company has a complete line of Lightning Arresters, Choke Coils and High Frequency Surge Absorbers, for all classes of service. Power Companies needing Lightning Arresters for high voltage lines should investigate our Oxide Film type which contains no liquids, does not require daily charging and which has the same operating characteristics as the well known Aluminum Cell type.

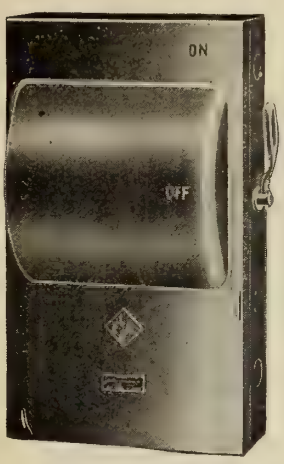


OXIDE FILM TYPE LIGHTNING ARRESTER WITH COVERED SPHERE-GAPS FOR OUTDOOR SERVICE.

Canadian General Electric Co., Limited

HEAD OFFICE TORONTO

Branch Offices: Halifax, Sydney, St. John, Montreal, Quebec, Cobalt, Ottawa, Hamilton, London, Windsor, South Porcupine, Winnipeg, Calgary, Edmonton, Vancouver, Nelson and Victoria.



Langley

Cabinets
Cutout Boxes
and
Externally Operated Switches

Made in Winnipeg
by

Langley Electric Manufacturing Co. Ltd.
WINNIPEG MANITOBA

XCELADUCT

GALVANIZED

Approved by the Hydro-Electric Commission of Ontario
Labelled under supervision of Underwriters' Laboratories

Made in Canada Conduit

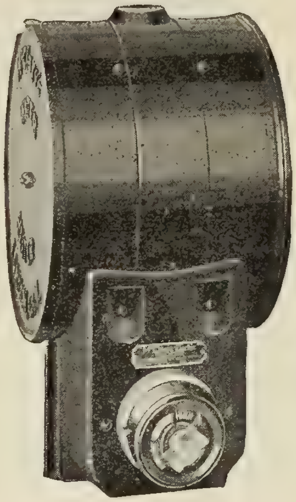
Electrical Wiring Made Safe

For All Electrical Installations

Manufactured by
National Conduit Co., Limited
Toronto

Sales Agents for Manitoba and Saskatchewan—Filer-Smith Machinery Co., Limited, Winnipeg.

Business is good for the man who keeps pace with modern labor savers



The Electrical man who is ambitious to progress and keen to add to his profits will welcome

McClary's

New Electric Water Heater

as an asset to his business. Here is an Electric Water Heater simplified to the last degree. Complicated parts have been banished. The Heater operates with an ease and regularity hitherto unkown, due to modified construction. It will satisfy users because of its heating abilities—it will please you because you can repair it in a few moments—no necessity to return it to the factory when anything goes wrong.

Consult with our representative or write us direct for further particulars of this latest addition to McCLARY'S successful Electrical line.

McClary's

London **Toronto** **Montreal** **Winnipeg** **Vancouver** **St. John, N.B.**
Hamilton **Calgary** **Saskatoon** **Edmonton**

FERRANTI

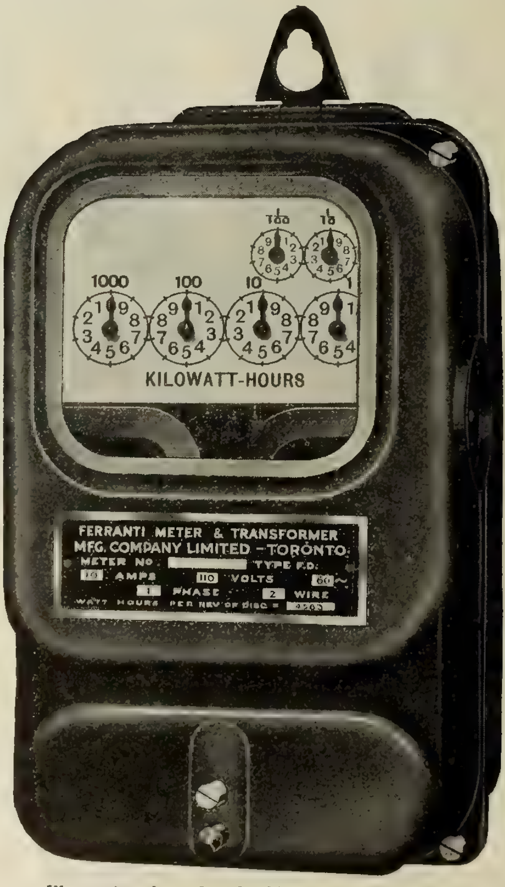
Type F. D. WATT-HOUR METERS

"Built Like a Watch"

Ferranti F. D. Meters are accurate, reliable and durable, embodying simplicity of design and refinement of workmanship.

The features of this model are light weight, definite graduated-scale adjustments, large terminals and choice of clock or cyclometer dials.

Ferranti Meter and Transformer Manufacturing Co., Ltd.
26 Noble St., Toronto


1000
100
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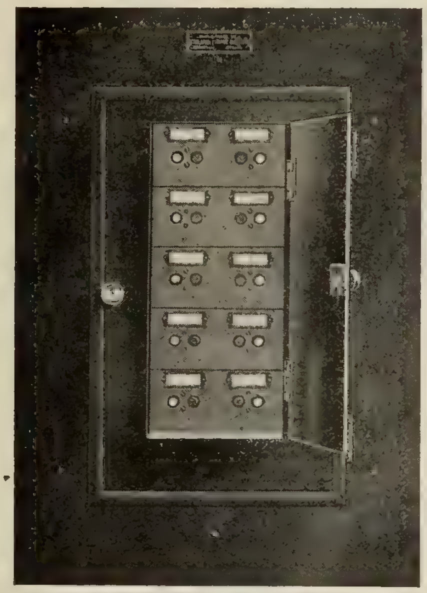
1
100
10
KILOWATT-HOURS
FERRANTI METER & TRANSFORMER
MFG. COMPANY LIMITED - TORONTO.
METER NO.
TYPE F.D.
10 AMPS
110 VOLTS
60 ~
1 PHASE
2 WIRE
WATT HOURS PER REV OF DISC =

Illustration shows Standard F. D. Meter half size.

DEVOE - LATEST - SAFETY - PANELS

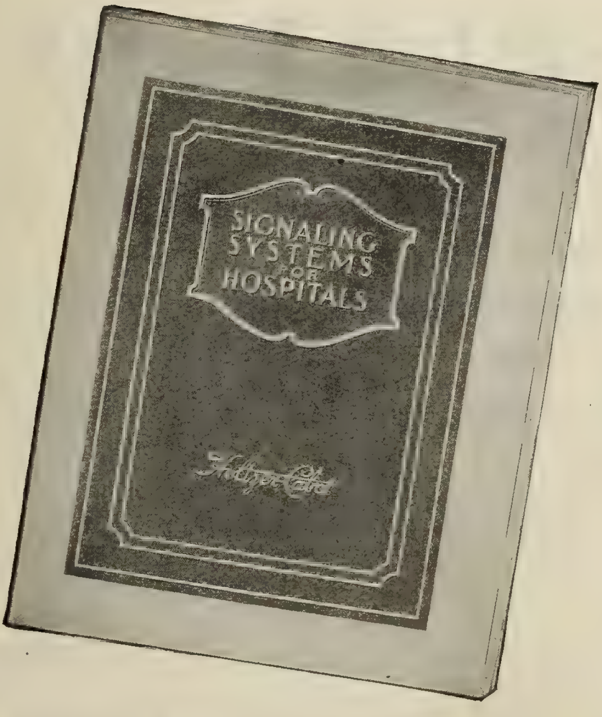


Our new catalogue; No. 10, describing the above panels, will be ready shortly for distribution.

Send us your specifications and we will quote you prices.

The Devoe Electric Switch Company

414 Notre Dame West, Montreal, and 105 Victoria St., Toronto, Ont.



Holtzer-Cabot

Signal Systems for Hospitals

Nurses' Call
"In" and "Out"
Watchman's Report
Doctors' Call
Fire Alarm
Telephone

Mr. Contractor:— Every new hospital and many existing hospitals are prospects for one or more of these efficient, essential labor saving and protective signal systems.

Send for our new 42 page brochure, giving complete description, layout, wiring diagrams, etc.

The Holtzer-Cabot Electric Company

BOSTON
BALTIMORE
CHICAGO
PHILADELPHIA
CLEVELAND
NEW YORK
SAN FRANCISCO

S-148

RADIO

We carry stock in Montreal for Radio Dealers

CRYSTAL SETS (The Famous Premier Junior)	RECEIVING TUBE SETS
TWO STEP AMPLIFIERS	RHEOSTATS
DIALS	CONDENSERS
TRANSFORMERS	SOCKETS
HEAD SETS	ETC.

Write to us for prices on any radio parts or sets in which you are interested for immediate or later delivery

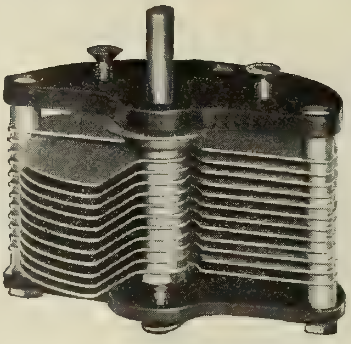
J. A. ANDERSON & CO.

205 Mansfield St., Montreal

Agents for

PREMIER RADIO CORPORATION OF AMERICA
78 Fifth Ave., New York, N. Y.
DICTOGRAPH PRODUCTS CORPORATION OF AMERICA
New York - - - N. Y.

Variable Condensers



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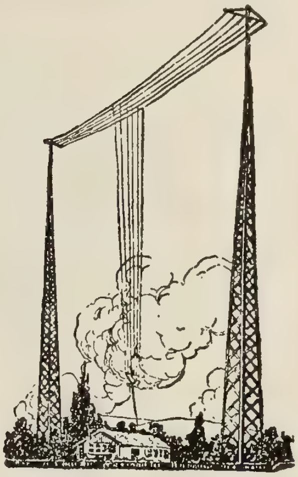

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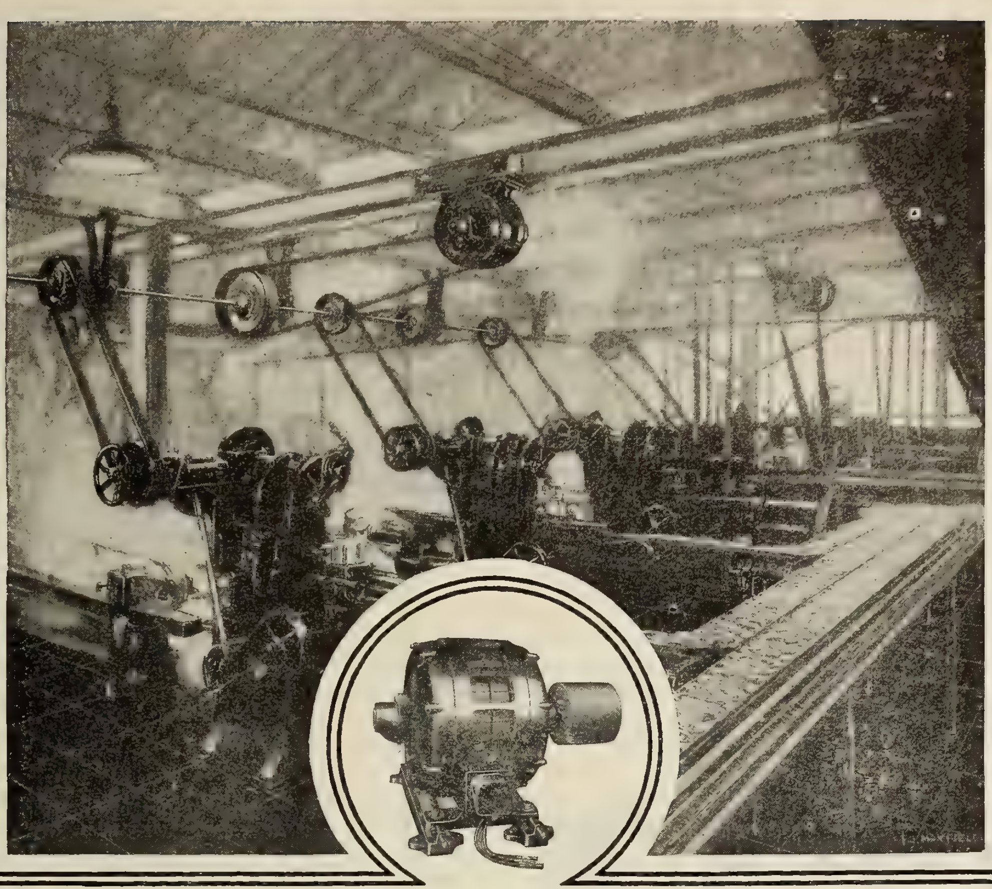

THE steam and heat of the food packing plant, the dust and grit of the cement mill, the humid, lint laden atmosphere of the textile mill—all adverse service conditions such as are found in many types of industrial plants have but little effect upon the life and reliability of R & M motors. Their low temperature rating (40), thoroughly moisture-proofed windings, dust-protected bearings and sturdy construction insure long, reliable service, however severe the operating conditions may be.

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The Robbins & Myers Company of Canada, Limited

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Robbins & Myers Motors

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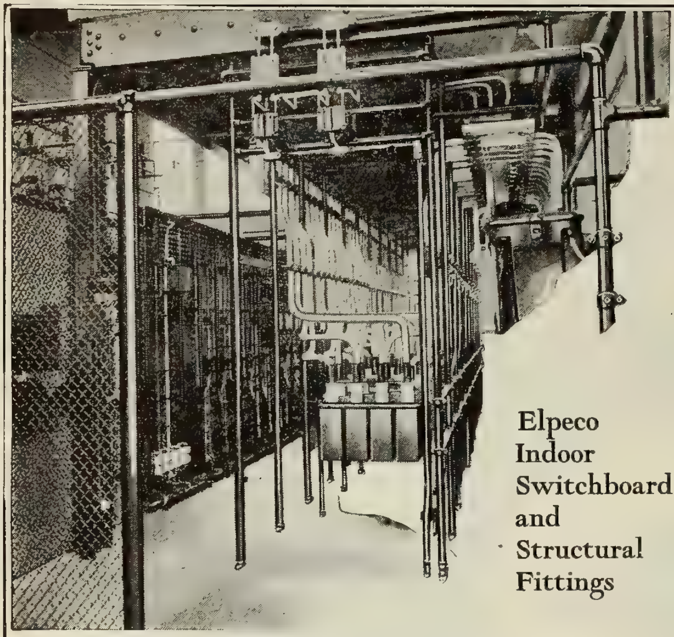

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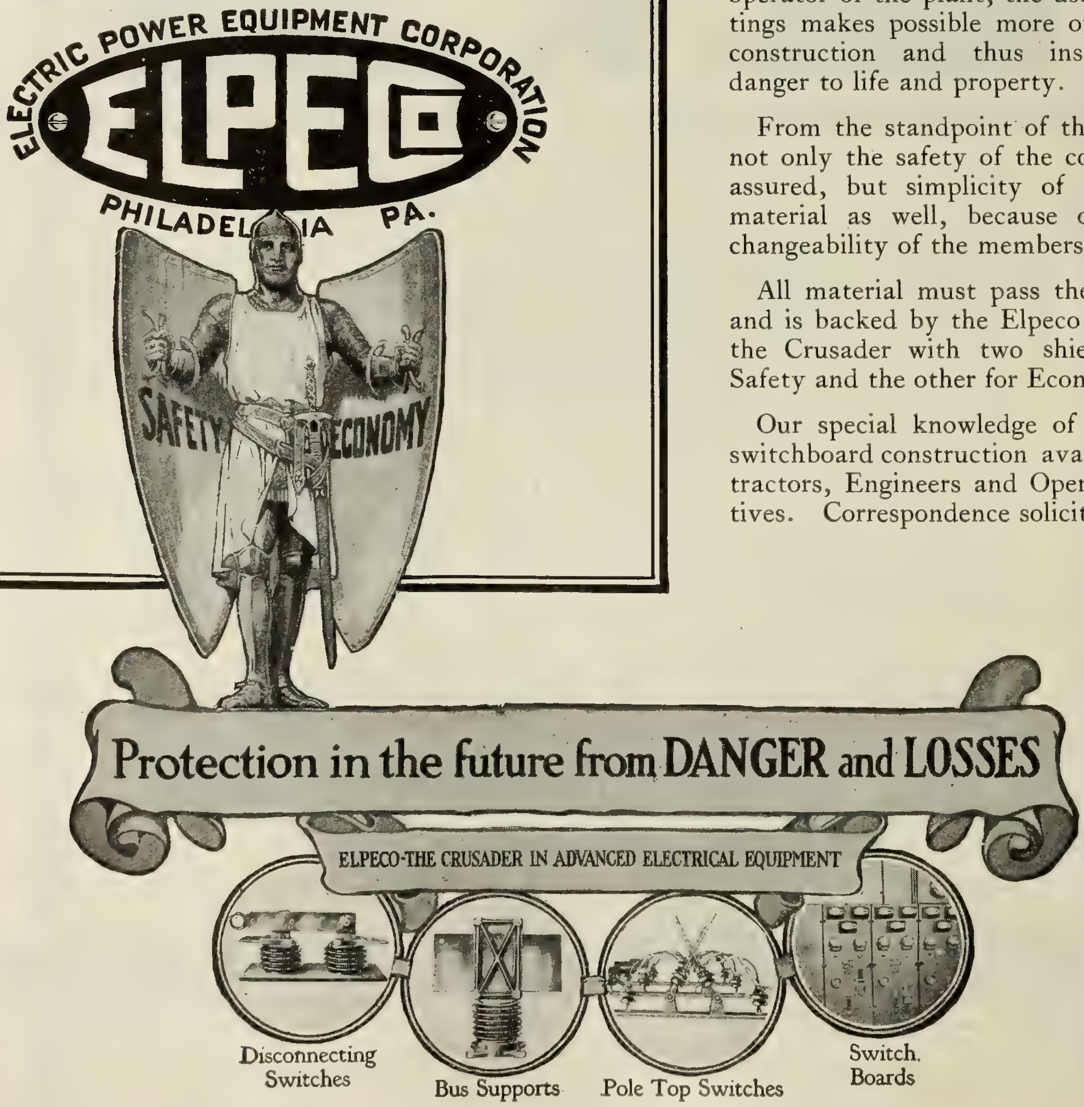
All material must pass the Elpeco test and is backed by the Elpeco trademark—the Crusader with two shields, one for Safety and the other for Economy.

Our special knowledge of high tension switchboard construction available to Contractors, Engineers and Operating Executives. Correspondence solicited.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Generation, Transmission and Application of Electricity

For nearly thirty years the recognized journal for the Electrical Interests of Canada.

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Radio Legislation

It is not widely known, we believe, that according to an act of the Dominion Government, there is a penalty attaching to all persons operating radio equipment without a license. The Government has not taken proceedings under this act, we understand, as it is their desire to give the general public every opportunity, of their own free will, to obtain a license. They are, however, appointing radio inspectors in the larger cities and districts of the Dominion, and when all these appointments are operating it is expected there will be comparatively few licensed stations. Licenses may be obtained from all post-masters.

The importance of licensing radio operators is evident. In the first place, there is no other means of obtaining statistical information on the number and size of radio stations in Canada. Further, it is easily seen how important it may be for the government to know the location of all receiving and sending equipments. In case of international complications, for example, it would be absolutely essential that the government should be able to locate and control all such equipments.

The suggestion has been made that retailers should be held responsible for the purchase of licenses and should be required to refuse to sell equipment to other than license holders. This would involve considerable inconvenience, however, and it is hoped the general public will be sufficiently seized of the necessity for co-operation to make the necessary expenditure of one dollar. No doubt, in due course, the government will vigorously enforce the act.

The wirelesss situation in Great Britian seems to be somewhat more complicated than is the case in Canada and the problems created have been productive of legislation which it is interesting to examine as a model upon which our Dominion radio laws may to some extent be based.

Wireless licenses are subject to such terms, conditions and restrictions as the Postmaster-General may lay down, and penalties are provided for the contravention of the regulations or of the terms of a license. Three specific offences are created, viz., the sending by wireless telegraphy of a message of an offensive character, or a misleading signal as to a vessel in distress, or improperly divulging the purport of any message. For these offences a fine not exceeding £10, or imprisonment for 12 months, may be inflicted. Apparently, the old distinction as to experimental licenses is to disappear, and the Act is to be applied to aircraft (with the necessary modifications) and to visual or sound signalling stations for communicating with ships at sea. Provision is made for the control of wireless telegraphy, or of visual or sound signalling apparatus in cases of national emergency.

This legislation reflects a general loosening of the official grip upon wireless in England of which the latest development has been the postmaster-general's plan for the encouragement of amateur wireless operators by permitting a number of leading manufacturers to broadcast at certain hours. This has hitherto hung fire despite the enthusiasm of amateurs.

One of the objections raised by the manufacturers was that they would secure no return from the expense incidental to broadcasting, while foreign makers would be likely to under-sell them with apparatus.

Postmaster-General Kellaway has met these complaints by the announcement that the British market for a period of two years must be restricted to apparatus of British manufacture.

Those Cheeky Electric Merchants! Now Robbing the Jewellers

At a recently held meeting of the Scottish Association of Watchmakers and Jewellers, the president (Mr. Broadbent) said he was pleased to see a reference in the annual report to lectures concerning electric clocks being given in connection with the watch and clock making classes at the Glasgow Royal Technical College next session.

There was no doubt (he added) that in the future they as jewellers should learn as much as they possibly could about electric clocks because **there was a danger that they might allow this trade to get into the hands of electricians and ironmongers.** It was now their time as watchmakers and clockmakers to come forward and claim that they were able to tackle these things, and he personally believed that there would be a great avenue of business opened up to them in this direction in the future. By degrees they were finding certain things slipping out of the jewellers' hands, which should not do so.

Electric appliances were one of the things of the future and while at the present time they occasionally sold a spirit kettle, it was worth considering how many electric kettles were sold by other dealers for each kettle that they sold. It was the same with electric clocks—how many jewellers dealt with such clocks? In his opinion there was no reason why the jewellers should not come forward and capture this electrical trade. He did not suggest that they should sell any kind of rubbish, but he thought that many of them would be able to work up a good trade in electrical appliances of a good class character. He thought it might be a good idea if some lectures were given at the Royal Technical College or in their own association rooms on electrical heating appliances, and he threw out that suggestion for what it was worth.

Electricity (included Mr. Broadbent) was **not a very difficult thing to learn about,** and in addition to electric clocks he would also like to see them stocking electric heating appliances, electric table ware, etc. He saw no reason why their own electro-plate manufacturers should not manufacture such things as well as foreign firms. He was sure that they could turn out a decent article to compete favorably with any other. (Applause.) He had much pleasure in now moving the adoption of the annual report.

Mr. James Chalmers (in seconding the adoption of the report) said he hoped that the interesting remarks made by Mr. Broadbent would duly appear in the trade press, and would be read by all parties interested. Personally, he agreed that it was **a great pity that so much trade which could easily be handled by jewellers was now getting into the hands of ironmongers, electricians and others.** There was no doubt that they as jewellers and watchmakers had a splendid opportunity for dealing with electrical appliances, and he thought that Mr. Broadbent's remarks should be kept in view by them all.

The Chairman: I thank Mr. Chalmers for these remarks, and I can only again add that I believe there is a big industry to be tapped by dealers as far as electricity is concerned. Why should we let the ironmongers and all sorts of other people sell these things without selling them ourselves? I personally see no reason why we as jewellers should not be able to handle the trade in electrical heating appliances.—Electrical Industries (England).

Programme of the "Electrify Movement" Embraces a Wide Range of Activities

The campaign recently initiated by the National Electrical Light Association, and known as the "Electrify" movement, is taking more definite shape. For a time it appeared as if a certain amount of overlapping of activity of the various electrical organizations would result, but it appears that these different organizations have got together and arranged for definite fields, for example, certain definite work is being delegated to the Elecerical Jobbers Association, to the Electrical Supply Manufacturers Association, to the National Association of Contractors and Dealers, to the Society for Electrical Development, and so on. For example: The Electrical Supply Association will undertake the collection of data and information regarding the situation in 15,000 cities and towns served by electricity, and a questionnaire will be drawn up and sent out for this purpose.

In discussing the activities of the "Joint Committee for Business Development" for the coming year, the five following definite activities were outlined:—

1. A complete roster of the commercial men in central stations in each community.
2. Assist in every way possible the organization of Committees, Electrical Clubs, Co-operative Associations, Boards of Trade or Electric Leagues in all cities and towns in America.
3. Appearance of members of the Joint Committee at various conventions and meetings and their assistance in the field activities.
4. Development of a bibliography of papers presented before the Commercial National Section during the last ten years, this material to be used to assist local activities and informing those employed in the electrical industry.
5. Issuance of specific information and data to be published as chapters of the five guide book subjects.

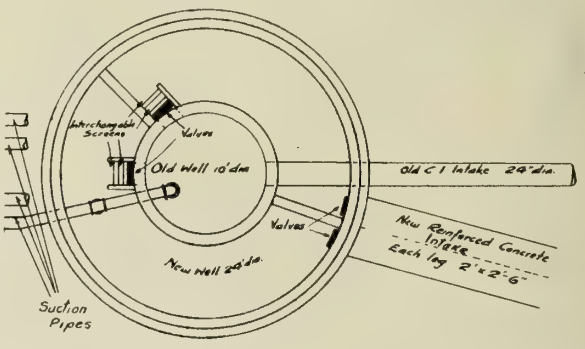
The first chapter of each of the five guide books has already been issued by the Committee, viz.—"Organization," "Lighting Appliances," "Wiring" and "Industrial Power."

An Intake Well That Can be Cleaned Without Shutting Down

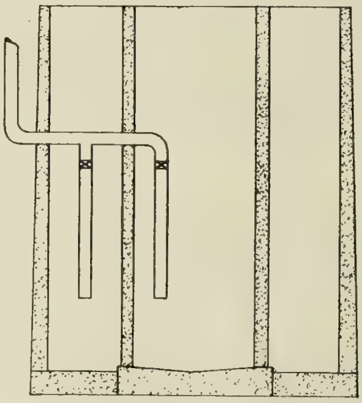
In every municipality there is generally some feature in the power supply that gives more or less trouble. The city of Saskatoon has not been exempt, but its engineers have successfully solved their particular problem.

The power plant is situated near the South Saskatchewan River and its equipment embodies Babcock & Wilcox boilers and turbo-generators. Each turbine has its own surface condenser and the necessary air and condensate pumps. The water for the condensers is pumped from the river .

The first installation included an intake well, which drew its supply from a 24-inch intake pipe extending into the river. With increased demand for water, this well proved inadequate—there was trouble on account of water shortage and because of the frequent necessity of cleaning the well and condensers, due to large deposits of sand and foreign matter.



PLAN



SECTIONAL ELEVATION

INTAKE WELL

The problem was solved by constructing an outer well as shown in the drawing. It was divided into two halves, each half separately fed from a new duplicate intake pipe. Gate valves were installed at the entrance to the outer well and openings for valves and screens were made in the inner well wall at a point furthest away from the intake. Suction drop legs were also installed so as to pull water directly from the outer well when desired.

This construction made it possible to draw water from any one of the three wells. The flowage through either half of the outer well is at low velocity. The result is that the sand is deposited, the screens hold up the foreign matter, and accumulated deposits can be removed without affecting continuous operation.

The Application of Electricity in the Manufacturing Industry---4

A General Analysis of the Conditions in Pulp and Paper Mills Embracing a Description of the Apparatus that has Been Developed to Meet the Peculiar Demands of This Industry*

Electricity in the form of power first became a factor in the pulp and paper industry about 1900—and during the past twenty years the advancement of electrical development in that industry has been remarkable. From the first major installation of less than one thousand kilowatts capacity, the demand of the individual mill has increased until there are several installations of approximately ten thousand kilowatts, and a few still larger, the average capacity being far in excess of the first important development. We can attribute this advancement principally to the two following reasons:

(1)—Power can be electrically distributed and applied throughout the mill and with greatly increased economy over former methods.

(2)—The development of electrical equipment suitable for the service demanded.

The major advantages of applied electrical power over former methods are briefly as follows:

1st—Centralization of power generating and distributing equipment under the control of a few skilled operators.

2nd—Two or more generating units may be installed, thus preventing a complete shut down in case of trouble. Further, more economical operation is a result at partial loads.

3rd—The power from several small developments may be combined and successfully applied.

4th—The manufacturer's plant may be placed in the most advantageous position, irrespective of location of power plant.

5th—The mill buildings may be arranged to reduce to a minimum, handling of the product, without reference to power supply, thus reducing conversion costs.

6th—Extensions or additions to present mill where power supply exhausted is allowed through ability to secure additional power from outside souces.

7th—Elimination of unnecessary line shafting and belting reduces friction loss and personal hazard.

8th—Equipment may be operated to secure maximum production with minimum power consumption.

9th—Distribution can be so arranged that troubles in one department will not interfere with another.

10th—With proper sub-division of distribution, power is consumed by a department only when in operation, therefore greater economy of its use is possible.

11th—The power consumption of an individual motor, or for a particular operation may be accurately determined at any time or continuously, for the purpose of ascertaining cost.

12th—A cleaner, better and more uniform product is a result.

Losses High on Indirect Drive

The majority of pulp and paper mill equipment, in earlier years, was mechanically driven by water wheels or a combination of steam and hydraulic units, power, as a rule, being transmitted to the various machines through a complicated system of gearing, line shafts, rope drives or belts; the prime mover was direct connected in but a comparatively few of the many different drives. The friction loss for such drives is usually assumed to be about 15 per cent and this figure is approximately correct under ideal conditions, such as correct shaft and bearing proportions, accurate alignment and proper belt tension. Ideal conditions, however, cannot be maintained and the friction loss,

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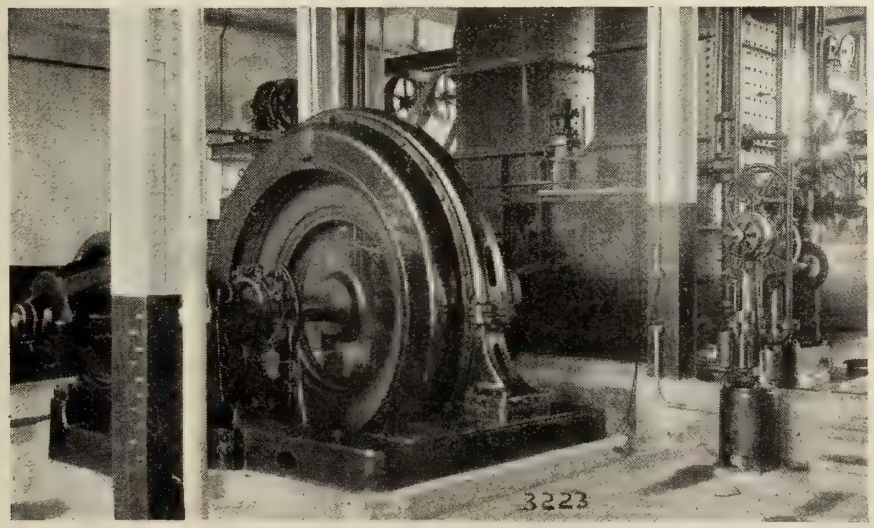
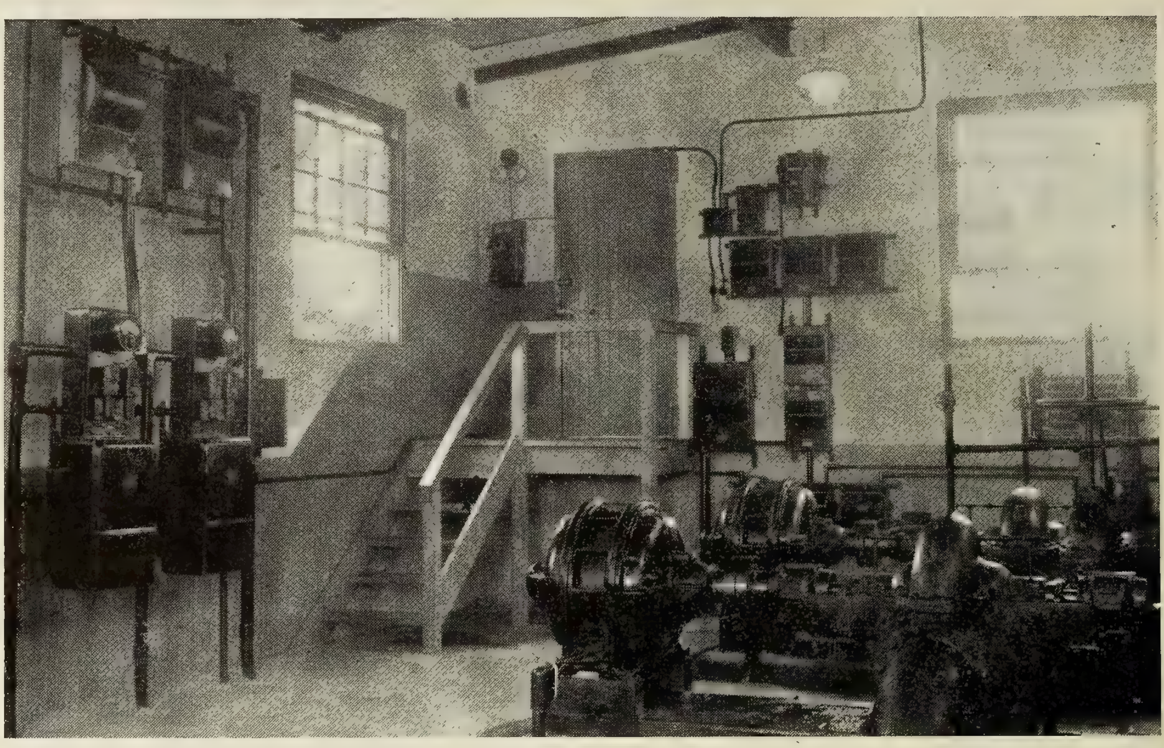
*For certain information contained in this article we are indebted to R. W. Leeper, Power Engineer H. S. Taylor Ltd., Montreal.



One of a battery of three **1400** h.p., **220** volt, **232** r.p.m., synchronous motors driving magazine grinders in Brompton Pulp & Paper Co.'s mill East Angus, Que. Installation made in **1920**.



Low Head Pump House, Provincial Paper Mills, Port Arthur. Two 75 h.p., 550 volt motors, direct connected. An example of thorough electrification including power, lighting and signalling equipment.

while indeterminate, is always greater under load, and is usually higher than the assumed figure of 15 per cent, a safer estimate for this loss being at least 25 per cent and it may even be higher

The First Motor Drives

The first motor drives naturally followed closely the former methods, the motor replacing the engine or water wheel, as the case might be, the mechanical transmission to a great extent being retained, and often where installed in existing mills the former prime mover was held in reserve to pick up the load in case of trouble. With the growing appreciation of the reliability, economy and high efficiency of motor drive the applications increased, the requirements of individual machines were accurately determined and special equipment was developed suitable for the service to be performed.

Two Main Types of Drive

In the application of motors, two systems are in general use which are commonly known as "group" and "individual" drive and for each installation the relative merits of the two systems must be determined. Group drive is usually selected where there are a number of small units, all of which must run at the same time, the shut down of any one affecting or interrupting the process. Such a number of units can be grouped and driven from a line shaft to advantage, a good example being the constant line of a paper machine. Such an arrangement is also preferable for a line of duplicate machines such as wet machines, screens, deckers, etc., where individual motors would be expensive and unnecessary. Individual drive is preferable where the duty is intermittent, or where the driven machine is a complete unit in itself, as power is consumed only when the unit is in operation, and no interference can be caused through operation of other equipment. Super-calenders, pumps, Jordans, and grinders as a rule are in this class. In that it is generally admitted that more minor interruptions to service are caused by trouble with the control equipment, than with the motor itself, especially in the lower ratings, serious consideration should be given to too strict adherence to the principle of individual drive.

Alternating Current Universal

Alternating three phase current has been found, after many years practical experience, best suited for industrial power application and is almost universally selected to-day for the pulp and paper mill. By its use power, either in small or large quantities, can be economically distributed over large areas, it can be readily transformed so that proper voltages are available for various applications, the equipment is simple, and even if operated continuously under extreme conditions, affords maximum reliability and high efficiency with minimum maintenance. The current carrying parts may be totally enclosed, permitting the use of higher voltages without endangering the operators, thus reducing distribution losses and increasing efficiency; the efficiency of a properly designed alternating current installation being at least 80 per cent from the shaft of the prime mover to the driven equipment, not including losses due to long distance high tension transmission lines where required. This efficiency can also be maintained as it is not affected to the same extent by line shaft and belting conditions, as is a purely mechanical system of distribution.

Types of Motor Used

Alternating current motors are especially suited to the service encountered in the pulp and paper industry where reliability is the first consideration, and where the greater percentage of drives are of the constant speed type. The first cost is low, the parts are few in number and built to withstand hard usage, the electrical characteristics are such that high efficiency is obtained over a wide load range, the windings may be impregnated to resist moisture or acid fumes, and for the types most used a commutator is not required, thus reducing materially the fire hazard. For pulp and paper mill drives, three types of alternating current motors are used, commonly known as squirrel cage, wound rotor or slip ring, and synchronous.

The squirrel cage motor is selected where constant speed with moderate starting torque is required which includes the majority of paper mill drives such as pumps, Jordans, and chippers.

Cell Room, Electrolytic Bleach Plant, Howard Smith Paper Mills Cornwall, Ont.

For those drives where high starting and pull-out torque with constant speed is demanded, the wound rotor or slip ring motor is preferable. In this class may be included drives for beaters, conveyors under load, and heavy line shafts. Super-calenders are now being driven with slip ring motors, this application, however, demanding the varying speed type in place of constant speed. Slip ring motors are more complicated and expensive than the squirrel cage type, but for heavy duty this additional expenditure is fully justified.

The modern synchronous motor can be selected for grinders, Jordans and motor generator sets where of appreciable capacity, the proper application and use of which will improve the power-factor, thus increasing the efficiency and capacity of the entire system. It is true that either static or synchronous condensers may be used for this power factor correction, but the initial cost is materially increased thereby.

Where Direct Current is Used

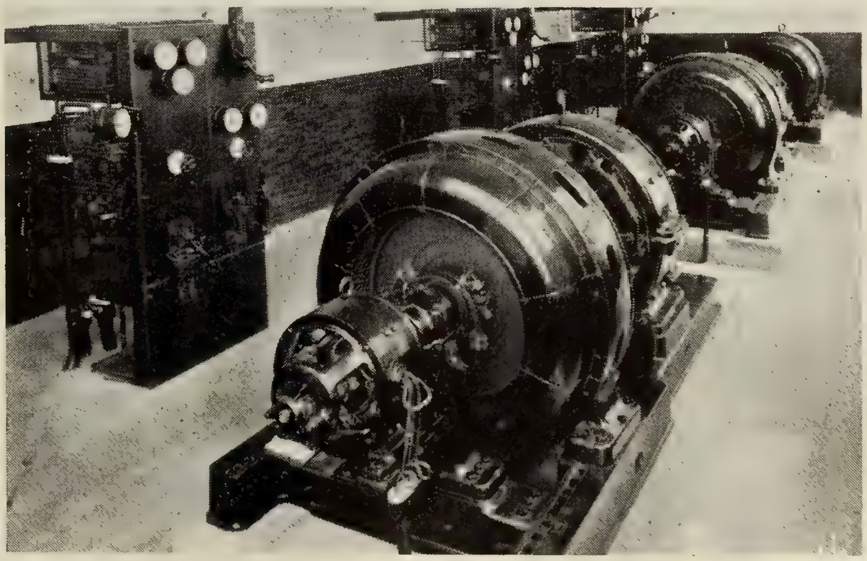
Direct current in the average mill is confined to those drives where a wide variation of speed is demanded and to certain electrolytic processes necessitating the use of continuous current. It is usually the case, however, that this direct current is supplied from the alternating current circuit through either a motor generator set or other form of converter.

The use of direct current motors in the mill is generally confined to the variable speed end of paper machines if electrically driven, the winders, cranes and certain finishing equipment where a wide speed range is required with uniform speed at any point regardless of slight load changes. For such application, adjustable speed direct current motors are preferable and show advantages over the alternating current type.

Synchronous Motors

The development during the past few years of synchronous motors of high rating for driving wood pulp grinders has advanced rapidly. In earlier mills, grinders were almost universally driven by direct connection to water wheels, and while this arrangement is unquestionably efficient, its disadvantages more than offset the saving from either an efficiency or initial cost standpoint. With grinders direct connected to water wheel the groundwood mill must be located with reference to the water power, even if completely isolated, therefore entirely unsuited from the manufacturing standpoint or its own operation or that of the conversion plant that may be a part of the development; it is frequently found that the available head is not suitable for developing the standard grinder speed, and lowered efficiency and loss of water must result. With electrically driven grinders, location can be selected irrespective of power source, power units can be selected of the highest efficiency, and what may be the most important of all, grinding capacity is not limited to the one source of power, any outside source being available for enlargement. It is also admitted that the modern magazine grinder, which is coming more and more into

Three 550 volt, 440 h. p., synchronous motors, driving d.c., generators, capacity of 1750 amperes. Power factor of plant raised from 78 to 90 per cent. Howard Smith Paper Mills, Cornwall, Ontario.



general use, can not be successfully operated except electrically, its high power demand and necessity for speed control being unsuitable for direct connection to a water wheel except under very unusual conditions.

Good Power-factor Conditions Required

For the first motor driven grinder installations wound rotor motors were as a rule seleted, the starting characteristics and general development of the synchronous type not being suitable for this heavy duty, although the efficiency and first cost were usually in favor of the latter type. With this grinder application in view, however, together with the demand for synchronous units to improve the exceedingly low power-factor conditions prevalent throughout the industry, this lowered power-factor greatly reducing the capacity of the generating equipment or being the cause of heavy penalties in the case of purchased power, the electrical manufacturer's attention was directed to the synchronous unit with the result that to-day the synchronous motor is usually selected for driving grinders, both of the magazine and pocket type, its uniform speed and general characteristics adapting it for this use as well as for other locations where a single unit of higher rating is demanded.

Steam Engine Efficient for Certain Purposes

Motor drives for the variable speed shaft of paper machines are not common, the non-condensing engine for many years having been the standard installation, and it probably will be for many years to come, from a steam economy standpoint where the entire steam demand is for drying and heating. Under such conditions the steam engine provides an extremely efficient drive and there is little shance for improvement. In mills, however, where the entire power demand is generated with steam or where centralization of power is desired, a motor driven variable line may be operated advantageously, an adjustable speed direct current motor replacing the steam engine and we find to-day many paper machines being so driven.

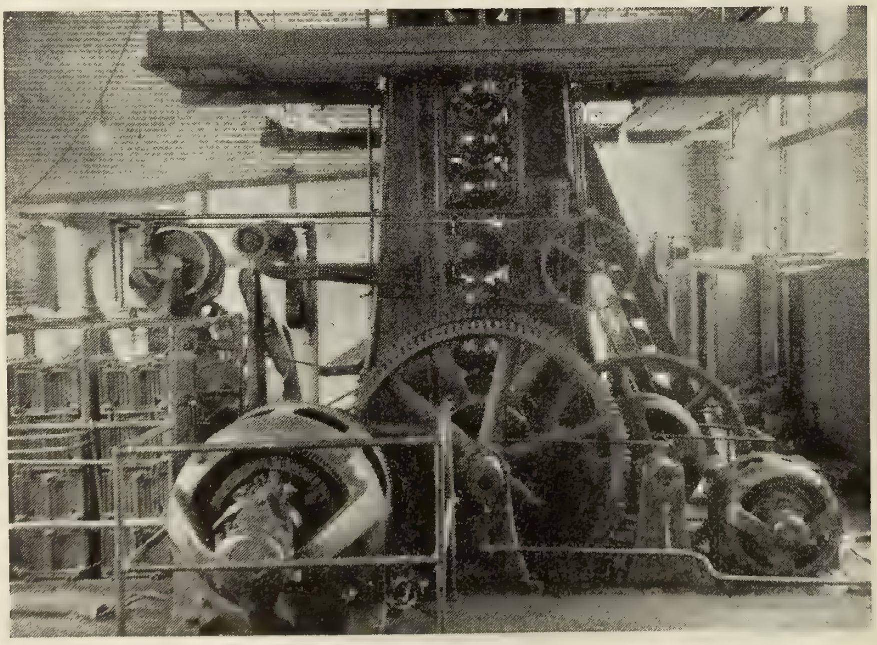
The Adjustable Speed Motor

This adjustable speed direct current motor drive with a speed range selected for the machine that it is to drive, is in many ways an improvement over former methods, as it has, in eliminating many complicated and unreliable speed changing devices, also eliminated varying speeds on the paper machine. It has not, however, eliminated the back line, belts, cone pulleys and gears, or reduced the loss between prime mover and machine, which is often as high as 50 per cent of the total power developed, or did it improve the lack of uniformity between the various sections, to which many breaks can be traced, or reduce maintenance on the back line which is 20 to 30 cents per ton of product.

With the demand for higher and still higher machine speeds, increased production and lower operating costs, the problem of maintenance and successful operation of the variable speed drive became more serious until the limit of former types was reached. For several years electrical manufacturers had been experimenting with various schemes by which it was proposed to drive each section with an individual motor, which was an exceedingly difficult problem on account of the close regulation required between sections often over a wide speed range. At present it can be said that the problem is solved, as there are today three different types of sectional individual drives in successful operation. This development eliminates all line shafting, rope drive, belts, gears, clutches and cone pulleys, and provides maximum reliability with minimum maintenance, high efficiency and perfectly adjusted draw between sections, or is the maximum speed at which the machine may be operated fixed in any way by the limitations of the drive. The sectional drive is applicable to slow speed as well as high speed machines, and while it is not an actual necessity for the slow speed machine, it is the opinion that its installation is justified.

Requirements for Speed Range

For either a single motor or sectionally driven machine, where the speed range is greater than about 3 to 1, voltage control or a combination of voltage and field control should be used, this arrangement requiring an individual generator for each drive, and even where the speed range is such that one generator may be used for two or more machines it may be advisable to install a generator for each machine, to avoid interference to but one unit in case of generator trouble. The generator in this arrangement is usually driven by a non-condensing steam prime mover or coupled in a motor generator set, exhaust steam in the former case being supplied to the dryers, and in the latter this steam be-



75 h.p., slip ring, 550 volt, 750 r.p.m. motor used on stack of calenders. Smaller motor shown used for starting purposes only. Kinleith Paper Mills, St. Catharines, Ont.

ing furnished direct from the boilers or from an extraction turbine if this type of equipment be installed.

Bleeder Turbine Generator Set

For those installations where the entire power demand is generated with steam, or where several machines are electrically driven, the extraction or bleeder type of turbine generator set is especially suited, low pressure steam being available upon demand, and not supplied irrespective of demand as in the case of the back pressure unit. This characteristic is of special value during wash up or other periods or when breaks occur or for other causes the dryer steam is shut off the paper machine. Steam from a turbine is also unquestionably superior to that from an engine for drying and heating purposes on account of being absolutely free from all oil which not only reduces the heat transfer in the driver but is a constant menace when the condensate is returned to the boilers from which the oil cannot be entirely removed by any known method. Before selecting a turbine of the extraction type, conditions must be carefully analyzed as it obviously cannot be used where the demand for exhaust steam is nearly equal to or greater than that due to the load demand.

Auxiliary Equipment

In the field of auxiliary equipment, such as switching, starting and control, developments have been in keeping with the major apparatus. From exposed knife switches and unsatisfactory fuses, the control has been improved until today all alternating current equipment, even of low capacity, can be protected by oil circuit breakers or similar devices with relays of suitable type. Fuses are still installed for cable protection or to take care of abnormal conditions in the distribution system, but they are not, however, depended upon except indirectly to protect equipment. With modern control all current carrying parts are enclosed so that accidental contact, due to careless operation, is practically impossible. New resistance metals and insulating materials have been developed, rheostats, relays, contactors, controllers, etc., made more rugged until these parts give little trouble, even in paper mills, where control equipment is often exposed to moisture, acid fumes, extreme temperature changes, and under the control of an operator unskilled in its manipulation, and under these conditions the continuous operation given shows to a remarkable degree the development that has taken place.

Temperature Ratings

For many years the standard temperature guarantee for electrical equipment was for full load continuously 40° C. rise, with 25 per cent. overload 2 hours, 50 or 55° C. rise, based on an ambient temperature of 25° C. For several years manufacturers of electrical equipment have standardized more and more on a rating of full load continuously 50° C. rise, with no load, based on an ambient temperature of 40° C. (104 F.) The capacity of equipment rated on the 50° continuous basis is approximately 83 per cent. of the former 40° basis. For some time generator and transformer guarantees have been made on the continuous basis, and for motors this guarantee is now becoming common and quotations are usually so based unless otherwise specified.

From the manufacturer's standpoint, there are several good reasons for the continuous rating. With the development of better insulating materials, iron of superior electrical characteristics, improved ventilation and design, it is possible to determine accurately the carrying capacity and safe temperature limits. It has also been found that deterioration of the insulation is not increased by operating at high temperature as long as certain safe limits are not exceeded and in many cases modern equipment will, under a given load, attain its maximum temperature in two hours or less, which was not true of the older types, and in order to give an overload guarantee on such apparatus, the capacity must be increased to that extent, thus increasing the initial cost. In the early days it was difficult to determine the power requirements of a particular drive and the overload guarantee was considered a safety factor, resulting in over, rather than under, motoring, thus increasing the first cost and reducing the efficiency and power factor.

Continuous Rating Favored

In a paper mill the load for many machines is variable, requiring the selection of motors for the maximum demand. With 40° rated equipment it was frequently possible to utilize the overload capacity at times of maximum demand whereas it is necessary to select continuous rated motors of higher capacity, as this type of equipment cannot be overloaded, and when this is done the chief advantage of the new rating, that of lower initial cost, is eliminated. On the other hand the power demanded by paper mill equipment under given conditions is well known and continuous rated motors can often be used thus effecting an appreciable saving. In comparing competitive proposals the temperature rise on which capacities are based must be taken into consideration to avoid unfair comparisons and possible trouble at some future date.

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220 Kv. Transmission

An interesting article has been prepared by Mr. R. J. C. Wood of the Southern Californian Edison Co., of Los Angeles, and which is to be presented at the Pacific Coast Convention of the A. I. E. E. at Vancouver, the second week in August, on the 220 kv. transmission system which is being installed for his company. The article points out that the highest present existing transmission is 165 kv., and that the increase to 220 kv. has been forced by the extremely rapid increase in the demand for power. As the amount of power that may be transmitted by a certain circuit varies with the the square of the voltage, it will thus be seen that the capacity at 220 kv. is practically four times the capacity at 165 kv. He concludes with the following summary:

Conclusions

Transmission at 220 kv. has been invested with a certain glamour, and the further investigation has been carried the more certain it appears that transmission at this voltage will only differ in degree from transmission at lower voltages, with which we are familiar. No new or startling effects appear probable.

The unequal voltage distribution over long insulator strings can be eliminated to the degree where individual units will be stressed less than they now are on lines in commercial operation. This is effected by shield rings which at the same time can be so designed as to keep any accidental arc well away from the insulators. Corona upon insulators and hardware is also prevented.

Standard suspension insulators can be used, so that 220 kv. transmission need not wait upon the design and trial of new types of insulator.

Transformers and switches are already developed, and have been built by more than one manufacturer.

The corona constants of large cables are known within rather narrow limits so that lines can be confidently designed to have definite known losses.

There are therefore no apparent obstacles in the way of 220 kv. transmission, the only requirement being that the amount of power to be transmitted shall be sufficiently large, and the distance great enough to warrent the cost of 220 kv. equipment. The increased carrying capacity of the transmission lines then more than offsets the equipment cost and 220 kv. transmission becomes more economical than at any lower voltage.

Efficiency in Incandescent Lamp Lighting

An Exposition of the Conditions Ordinarily Found, and Recommendations as to the Proper Method of Securing Maximum Efficiency

The report of the Lamp Committee of the C. E. A. at the recent convention of that Association, contained a quantity of useful data regarding incandescent lamps; many of the facts published have been little known to incandescent lamp users in general and in view of this the following article has been condensed from the Committee's report.

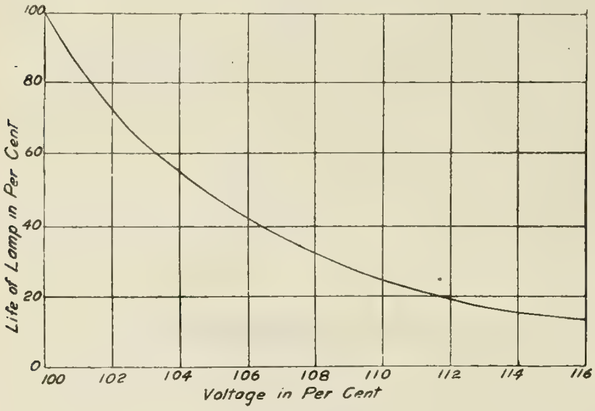

Fig. 1—Relation of Lamp Life and Voltage

Reduced Prices

After the introduction of the drawn-wire tungsten lamp, a reduction in price took place and prices have since gradually decreased, except for a period as a result of the war. It is satisfying to note that with the falling prices there have been also increases of efficiency.

Voltage Fluctuation and Lamp Life

The effect of voltage variation on tungsten lamps is very marked. A person unfamiliar with lamps might assume that if a lamp designed for certain voltage should burn a certain number of hours at over voltage, and the same number of hours at a corresponding under voltage, that one would compensate for the other, but such is not the case.

The relation between life and voltage is expressed in the following formula:—

$$\frac{L}{l} = \left(\frac{v}{V}\right)^d \quad \text{where :}$$

l—Life of lamp at rated voltage, v.
L—Life of lamp at any voltage, V.
d—is an exponent which for tungsten lamps is 13.8

As an example: if a 110-volt tungsten lamp is burned for 25 hours at 117 volts, and for 25 hours at 103 volts, there is a loss in the designed life of the lamp of 27.8%.

At 117 volts the life would be but 42.2%, thus

$$\frac{L \text{ (at 117)}}{l \text{ (at 110)}} = \left(\frac{110}{117}\right)^{13.8} = .422$$

of the life at 110 volts. Thus, the 25 hours of burning on 117 volts would be equivalent to $\frac{\quad}{.422}$ or 59.2 hours of burning at 110 volts. The percentage life for 103 volts is 251%, since

$$\frac{L \text{ (at 103)}}{l \text{ (at 110)}} = \left(\frac{110}{103}\right)^{13.8} = 2.51$$

The 25 hours at 103 volts is equivalent to $\frac{25}{2.51}$ = 10 hours at 110 volts. During the two periods of 25 hours the resultant consumption of life of the lamp has been 59.2 plus 10.0 or 69 hours, a loss of 19 out of 69.2 or 27.8% in the life of the lamp.

Curve No. 1 given below shows the relation of lamp life and voltage. This refers to a condition where lamps are burned continuously at over voltage. As an example, if lamps are burned at 106% volts, the lamps will only give about 42% of the designed life.

An analysis of lamp consumption indicates that the 40 watt vacuum is apparently the most popular size, with the 25 and 60 watt sizes following closely.

Curve No. 2 gives the relation of candle power to voltage on tungsten filament lamps. The curve shows that with a comparatively small reduction in voltage there is a large decrease in the light output.

It is suggested that when lamps are ordered, they should be ordered according to the socket voltage found in service or very closely thereto. These curves show the importance of correct selection of lamps according to the socket voltage. It is suggested that a large amount of educational work could be done along these lines by the Central Stations and that consumers be advised by some method of the correct voltage of lamps to buy. A tag left attached to all disconnected services, stating that "the lamps to use on these premises are those of . . . . volts rating," is one method of doing this which has been adopted. In certain cases it has been found advantageous for consumers to install regulators for their lighting load. This is a good practice wherever there is a fluctuation in incoming voltage that will affect the light and life of the lamp to any extent.

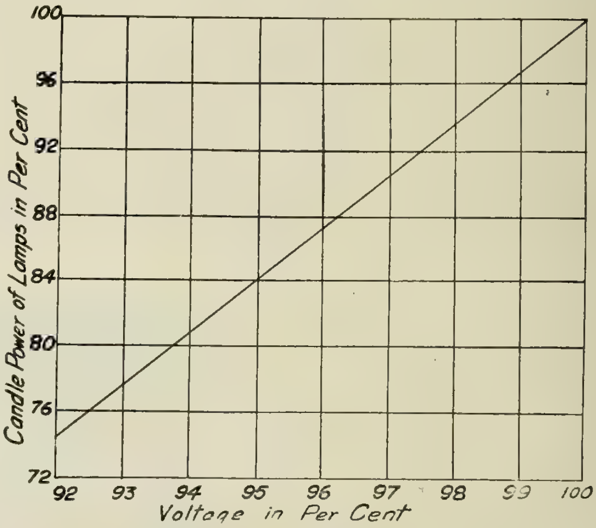

Fig. 2—Relation of Candlepower and Voltage

The Care of Lamps in Use

As a general rule, after the lamp has been put into the socket it is given no further attention until the lamp is burned out. Under ordinary conditions, if the lamp is not cleaned frequently, dust and dirt will accumulate to such an extent as to reduce the light given out by the lamp to a marked degree. As a matter of fact, if the lamps are not cleaned, the loss in light giving efficiency may be from 25 to 30% for offices and stores. In factories, needless to say, this figure may be much higher. A large public service concern offers

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*Presented before the C.E.A. by the Lamp Committee.

to its customers a lighting equipment maintenance service, and they have found that by maintaining lighting equipment once every month, the illuminating efficiency can be raised from 25 to 40 per cent. Curve No. 3 shows graphically the effect of the accumulation of dust and dirt and consequent loss of light.

Use and Advantage of a Foot Candle Meter

To-day there are many instruments in general use to measure certain quantities, such as temperature, weight, pressure and so forth, by definite standards. There has long been a need for a simple, compact, portable instrument to measure the intensity of light on any given plane, for factory, store, street and power-house lighting. A foot candle meter meets this demand. As a result, the light intensities of rooms, offices, factories, etc., may be very easily determined by means of a foot candle meter. By very little experience a person may use the instrument accurately, the readings being direct in foot candles and no calculations being necessary.

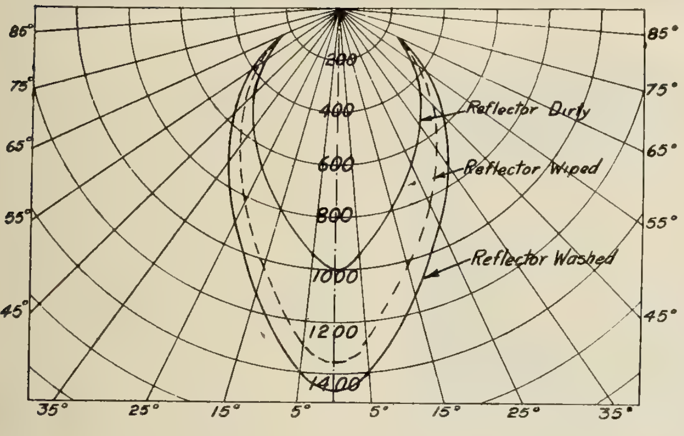


Fig. 3—Effect of Accumulation of Dust and Dirt

During the last few years engineers in illumination have carried on extensive investigations to determine the proper light intensity (foot candles) for various kinds of work. For certain kinds of fine work a desirable intensity of illumination varies from 10 to 50 foot candles, while for general rough work 4 to 8 foot candles is ample. Tables giving desirable light intensities are easily obtainable, and as a result, a factory manager is enabled to study his own illuminating conditions with the aid of a foot candle meter and tables showing the desired foot candles. This instrument certainly should be used wherever artificial lighting is applied. By the use of proper light intensity production may be increased and accidents reduced.

The foot candle meter measuring, 8" x 6" x 1½", consists of a battery, voltmeter, rheostat, screen and standard lamp. The light from this standard illuminates the screen, one side of which is exposed to the external light source. The point on the scale that is receiving the same amount of light on both sides, appears to fade out, thus indicating directly the light intensity (foot candles).

Better Illumination

Manufacturers, store managers, and executives are appreciating the need for better illumination. In practically all places where the application of light is carefully studied there is a demand for illumination of high intensity.

In a large department store an increase in illumination of 6 to 10 foot candles increased the cost of lighting 1% and increased the sales from 6 to 7%. High intensity illumination in stores properly applied gives the customer ample opportunity to examine possible purchases carefully before buying, which naturally results in less returned goods and better satisfaction.

Faulty and insufficient lighting costs in the end far more than efficient illumination.

In the factory poor lighting reduces production and increases shrinkage—a loss of time and money.

With regard to general production in a plant, it is to be noted that an increase of four times the lighting intensity will equal a sum that is but a fractional percentage of the pay-roll, and the sum thus spent will be well repaid by measurable increase in production. More attention to illumination in only a matter of the possibilities of its service to industry being seen by responsible executives.

Lighting has power to stimulate and where adequately used there is little chance for error, accident, and idleness.

The experience of Cleveland among other cities is very interesting, as showing that crime is decreased by better illumination of the public thoroughfares.

Lamp Specifications

The Canadian Electrical Standards Association is working on the preparation of a set of standard specifications for Incandescent Electric Lamps.

The final report of the committee has not yet been completed.

New Developments

The most important of the improvements has been that of the so-called Mill Type lamp, a new style to be used for sign lighting as well as to meet the requirements of a lamp suitable to withstand a heavy vibration. For sign work the 25 and 50 watt Mill Type sign lamps have been developed in a blue bulb, which gives a whiter appearance to the light.

These lamps are made up in a P19 bulb, 4⅜" over all, this size accommodates itself to the troughs now in general use. As the lamps are vacuum lamps the bulb does not reach as high a temperature as gas filled lamps, thus reducing the breakage due to rain and snow.

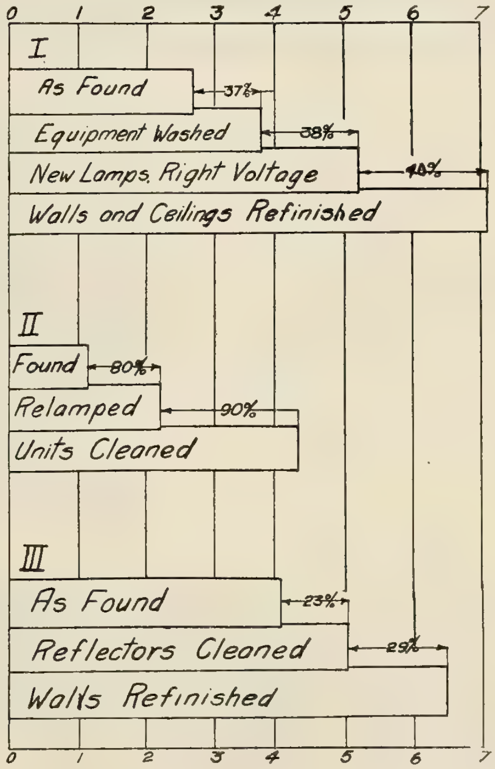


Fig. 4—Results Secured by Cleaning

This ruggedness in lamp manufacture indicates the trend of the present lamp engineering practice.

Hydro-electric Development at Cameron Falls, Nipigon River, Ontario

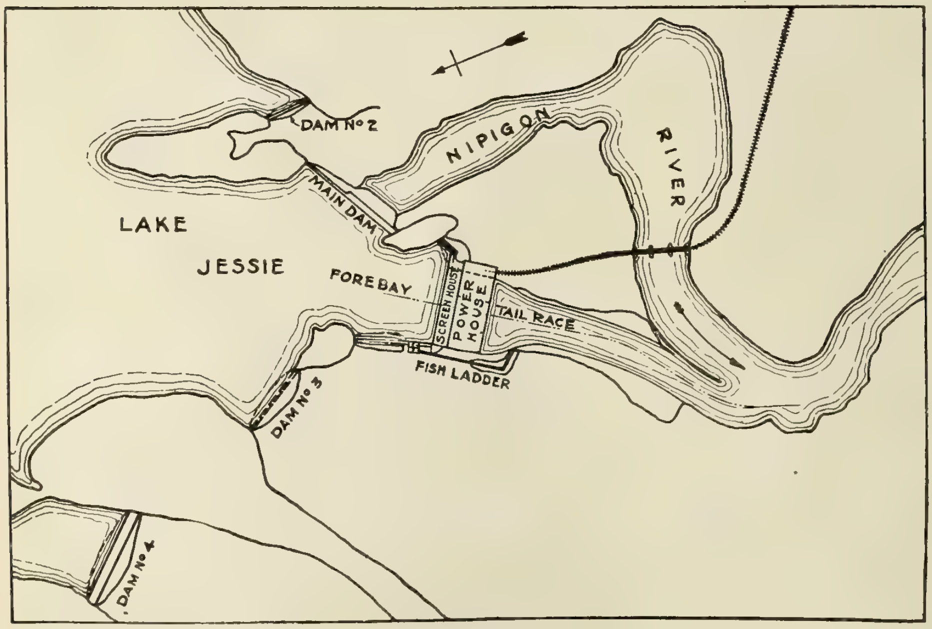
The First Two Units of an Ultimate Capacity of Six Totaling 75,000 Horse Power, Installed. Head Gates and Power House Foundations Completed for Full Capacity

The Nipigon river is an admirable stream on which to develop power. The river drains an extensive area and has a large annual run-off, which, due chiefly to the large and effective storage in lake Nipigon, may be controlled so as to give an unusually uniform discharge throughout the year. Moreover, the condition of the banks is such that the total fall in the river, from lake Nipigon to lake Superior, of 250 feet, can be concentrated at three or four power sites.

The Cameron Falls plant is situated at the lower end of lake Jessie, an expansion of the Nipigon river, which, being a large still reservoir, freezes completely over in the early winter and by thus providing an ice cover until the spring break-up, prevents the formation of the troublesome frazil and anchor ice.

The present development with its 78-foot head and capacity of 75,000 horsepower is completed for two units of 12,500 horsepower each. These are now delivering power to Port Arthur. The head works and power house foundations are completed for the ultimate installation of six 12,500 horsepower machines.

At Cameron Falls, nature has provided a convenient site where the power works may all be concentrated within a small area. In general, it may be explained that the power plant is formed by the construction of a dam across the Nipigon river at the lower end of lake Jessie and the excavation of short head-race and tail-race channels across the point of land formed by a bend in the river.



General plan of power development at Cameron Falls, Nipigon River, of which the first two 12,500 h.p. units, out of a total of 6, have just been installed by the Hydro-electric Power Commission of Ontario.

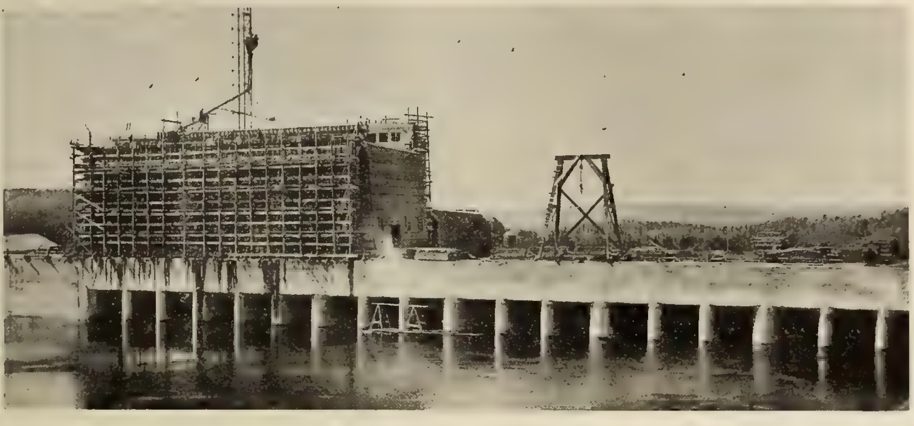
The Dam

The dam across the river is a solid, concrete, gravity-type structure, provided with eight spillway sections adjustable by means of stop logs for the regulation of the flow of the river. The stop logs in the sluiceways are raised or lowered by means of an electrically-operated winch which moves along an operating platform constituting a deck over the top of the spillways. The maximum height of the dam in the centre of the river is 67 feet.

The Power House

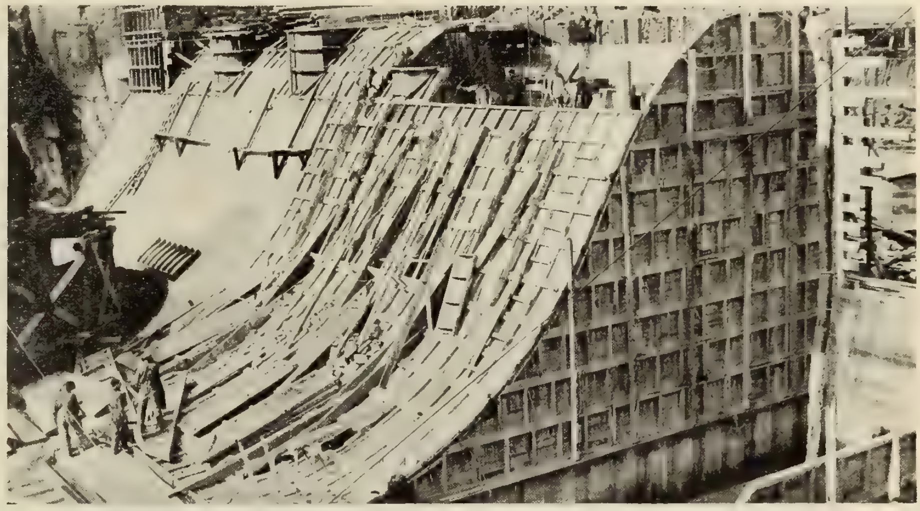
The power house is of the concentrated type of construction in which the gate and screen house, the penstocks, and the transformer station all form part of the same structure. Although the superstructure for the gate house and power house has been completed for only the two units now installed, nevertheless the gate house and also the submerged part of the turbine foundations have been completed for the six units of which the plant will ultimately consist. The gate house is provided with electrically-operated steel gates and in order to prevent trash and ice flowing into the turbines, removable steel screens have been installed. The penstocks are formed in the concrete foundations and are so designed as to deliver the water to the turbines at low velocities, thus insuring a minimum loss. In constructing the scroll cases for the turbines a departure has been made from the usual practice of using cast iron by forming the cases in the concrete. This has proved more economical in construction and gives also more efficient operating characteristics.

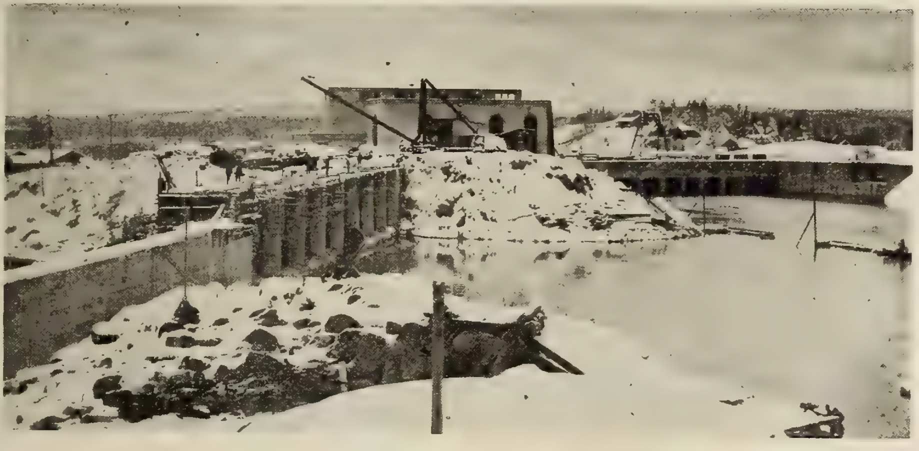
The turbines are of the Francis, single-runner, vertical type of 12,500 horsepower each, and operate at a speed of 120 revolutions per minute. They are controlled by the latest hydraulic-type governors, and in addition are provided with an emergency hand control for use in case of any failure in the governors. Each turbine is directly connected to a 10,600 kilovolt-ampere vertical generator which delivers power to the transformers at 12,000 volts. Each generator has its own exciter mounted directly on top of



Head works as they appeared on June 15, 1921.

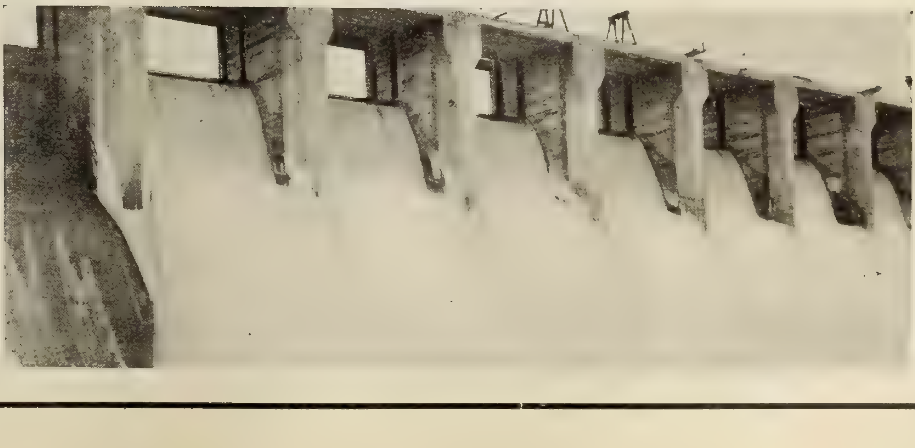
Dam No. 1 as it appeared on September 19, 1921





General view of the main Dam Nov. 15, 1921

Dam No. 1 from down stream side on Dec., 1921



the main frame thus making each machine in itself a complete unit.

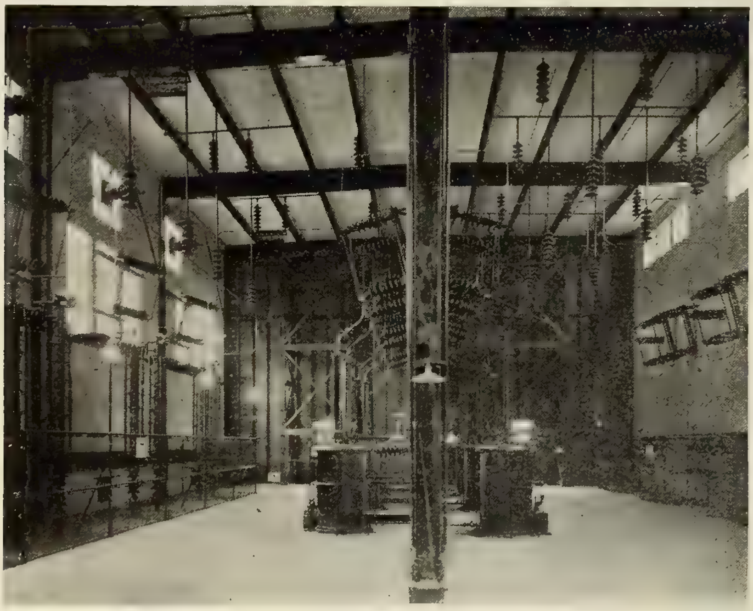
Travelling cranes are installed in both the gate house and the generating room; the former for use in operating the screens and the latter for effecting repairs to the main power units as well as for erection work.

The Fishway

Every year visitors from many parts of the world are found along the shores of the Nipigon river which is justly famous for its trout fishing. The Commission has given thought to the preservation of this sport. A fish-ladder has been provided around the west end of the power house. The design of the ladder has the endorsation of the Provincial Game & Fisheries department, and it is believed that the installation of this ladder has provided a free and satisfactory passage for the fish in their annual up-stream migration.

Electrical Equipment

Turning now from the hydraulic features of the plant to the electrical generating equipment, it may first be commented that in order to completely house the generating, transforming and station service equipment of the ultimate development, a superstructure having an overall length of 311 feet will be required; of this, 130 feet has been erected. The total width of the building from the north wall of the gate house to the south wall of the generating room is 150 feet. The height from the floor of the generating room to the roof of the high-tension room is 87 feet, and from the bottom of the tail-race 147.5 feet.



Interior view of Nipigon Power Station showing High Tension Switches and Arresters.

The superstructure has been built throughout of high-grade fire-proof materials, the framework being of steel, with walls, floors and structures for the electrical apparatus, of reinforced concrete. The ultimate development is for six generators with total capacity of 75,000 horsepower.

The generators, of which there are already two installed, are rated at 10,600 kv.a., 80 per cent., power-factor, 3-phase, 12,000 volts, 60 cycles. They are 26 feet in diameter. The rotors revolve at 120 revolutions per minute, corresponding to a peripheral speed at face of pole pieces of 7,917.5 feet or 1.5 miles per minute.

The weight of the total rotating part including the direct-connected exciter—which is connected to main shaft above the thrust bearing—the rotor complete, the turbine and the shaft, is approximately 125 tons, all of which is carried on a thrust bearing mounted on top of the upper bracket of the generator proper. This thrust bearing is 46½ inches in diameter and is designed to sustain a weight of 385,000 lbs. It is lubricated by mineral oil having a viscosity of 250 seconds at 100 degrees F. and is cooled by water circulating through a number of coils immersed in the oil.

The generators are air cooled, the air being drawn into the generating units through concrete ducts, either from the outside of building or from the generator room. The flow of outside air is controlled by dampers operated from the floor of the generator room. Each generator, when operating under normal load, requires 55,000 cubic feet of air per minute. The weight of the amount of air thus required in two hours and ten minutes would equal the weight (262.5 tons) of a complete generator.

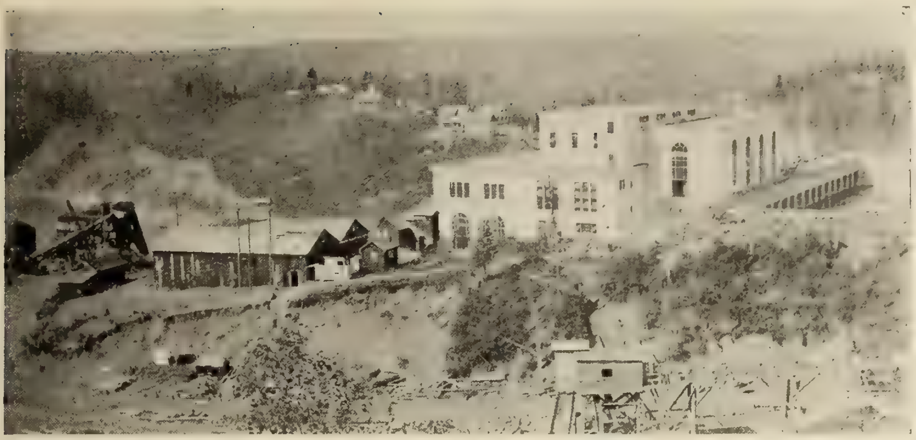
The station is equipped with a 75-ton electric travelling crane which is capable of handling the heaviest parts of the generator.

The electric power from the generators passes through 12,000 volt, oil circuit-breakers, to a duplicate bus, then to a bank of three, 8,000 kv.a., oil-insulated, water-cooled transformers where the voltage is stepped up to 110,000 volts. From these transformers, the power passes into the high-voltage room where it passes through the high-voltage oil circuit-breakers and buses, then out of the south side of the building where it is connected to the transmission line.

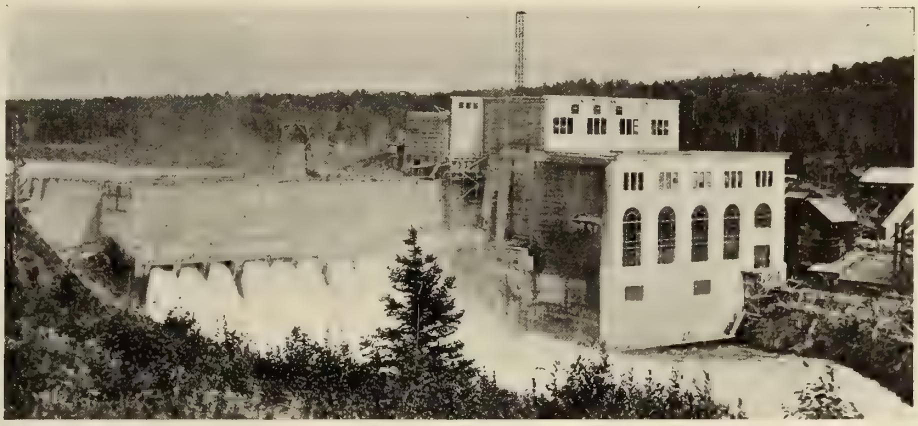
The power for the governor pumps, motor-generator sets, station lighting, elevator, etc., is taken from the 12,000 volt generator buses to a bank of three 250 kv.a. transformers where the voltage is stepped down from 12,000 to 575 volts. From these transformers this power is carried to a station service control-board whence it is distributed throughout the station. The control room is located at the east end of the station on the first floor of the control bay, and from this room the entire station will be controlled. Each section of the power house consists essentially of two generators, their bank of transformers and a transmission line. The switching equipment is such that any of the three sections of the power house may be separately operated or else operated in combination with either of the other sections.

A stair-way and an automatic electrically-operated elevator afford access to the seven floors.

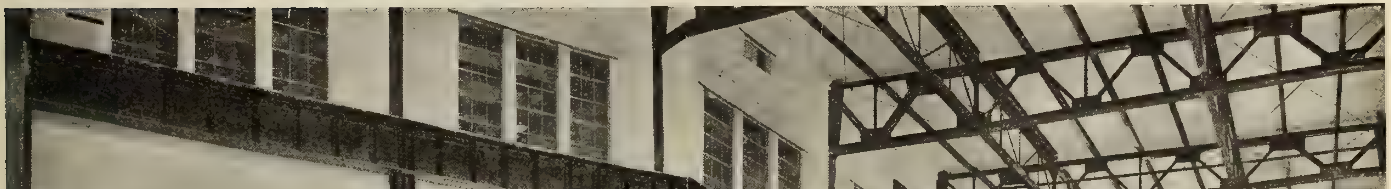
In the basement are two 3,000-gallon, oil storage tanks, one for transformer oil and the other for switch oil. There are also two 2-inch centrifugal, 250 g.p.m. pumps for the water cooling system for the generator bearings and transformers. These pumps have a sufficient capacity for the water-cooling system of the ultimate development. In addi-



General view of Dam and Power-house September 19, 1921.



General view of development as it appeared on September 26, 1921.



General view of interior of the Nipigon Power House, Cameron Falls, Oct., 19, 1921 tion there is one 2-inch centrifugal 50 g.p.m. pump for domestic water supply to the operators' cottages and one 3-inch centrifugal pump of 250 g.p.m. capacity against a 300-foot head for the fire protection of this station. Then there is the lubricating oil filter-tank which has a capacity of 3,667 Imperial gallons per hour. This is in series with the lubricating oil system for the generators and is capable of filtering oil from all the generators of the ultimate development. Alongside of this filter tank is an installation of two 2½ inch centrifugal, oil pumps of 75 g.p.m. These lift the oil from the filter tank up to the lubricating oil reservoir tank on the fourth floor. The oil from generator bearings feeds by gravity into the filter tank from which after being filtered it is pumped up into reservoir tank whence, by gravity, it is again fed to the generators.

Between the generator room and the transformer room is the 12,000 volt switch gallery with the 12,000 volt bus room and the high-voltage room above.

In the rear of the low-voltage gallery and extending the full length of the power house is the transformer room. At present there has been installed a bank of three 8,000 kv.a. transformers, also a compartment containing the three service transformers. To the rear of this building is the gate house.

On the west bank of the tail race, five houses have been erected for the operating staff, one of seven rooms and four of six rooms each. An additional house of eight rooms is yet to be erected. In addition there are three houses erected which were used for the construction staff but which will be retained for use of the operating staff.

Port Arthur Transformer Station

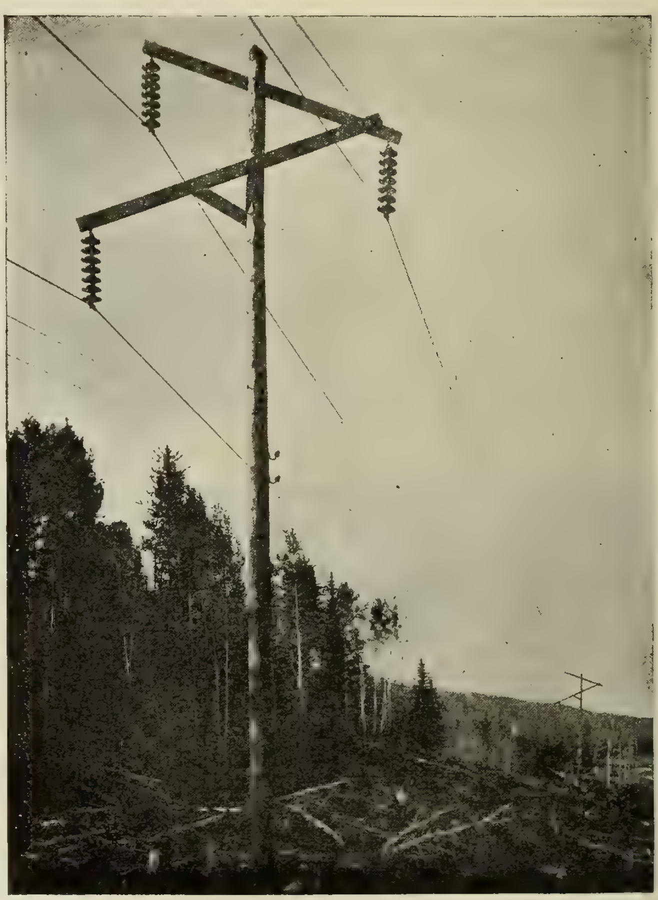
Eventually a permanent inter-city transformer station will be erected in a suitable situation, but in the meantime a temporary transformer station consisting of a building 67 feet long by 40 feet wide and 30 feet high, built of a wooden frame work with gunited cement walls has been built at Bare Point. On entering the building, the 110,000 volt power is carried through a high-voltage, oil circuit-breaker to a bank of three 4,000 kv.a. transformers where the voltage is stepped down from 110,000 to 22,000 volts at which potential power is delivered to the city of Port Arthur.

Progress of the Work

On the 1st of December, 1918, a small gang of men, by cutting and piling brush, commenced the work of clearing. On February 3rd, 1919, track was being laid from the Canadian National Railways' line to the camp site, on the 15th of March work was commenced on a temporary power house, and on June 6th, hand drilling and excavation commenced on the Cameron Falls power-house site. In the latter part of July, shovels were excavating the tail-race and the power-house site. On May 13th, 1920, the concrete footings were commenced for draft tubes Nos. 1 and 2. Portions of the physical equipment for the power-house reached the work in rapid succession. On the 31st of October, the 75 ton crane was ready for operation. On November 3rd the runner and shaft for No. 2 unit was placed in position, on November 5th the corresponding equipment for No. 1 unit was in position, and on December 13th at 8:55 p.m. No. 2 generator was ready for operating to be dried out. On the 16th of December, the transmission line to Port Arthur was phased out, found satisfactory, and at midnight on the 20th of December—just as the power contract was expiring—No. 2 generator was delivering Nipigon hydro-electric power to Port Arthur.

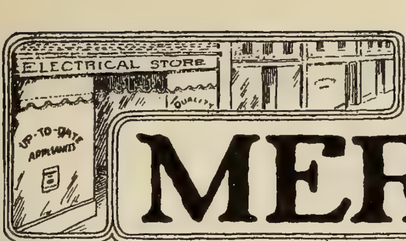
On January 9th, 1921, the final closure was made in the main coffer dam. On the 24th of the same month No. 1 generator was started, and on the 13th of March this generator was satisfactorily parallelled with No. 2. Diversion of water for power thus far was being made by means of the coffer dam with water at elevation producing a head of about 59 feet. On the 12th of April, 1921, drilling was started on the main dam site. On the 12th of August the first concrete was poured on this dam. On the 22nd of October all the auxiliary dams had been completed. On the 25th of November the water in the forebay was raised to elevation 732, on the 28th to 738 and on the 16th of December the stop logs were placed in the main dam in order to bring the water elevation to 745, giving a working head of 78 feet. On the last mentioned date the construction camp was closed and, with the exception of twelve men retained for construction plant repairs and for clearing out the camp, all the men were laid off.

While work was proceeding on the plant at Cameron Falls, other construction crews were busy erecting the transmission line. The clearing of the right-of-way was performed in several sections, the first being commenced on the 19th of May, 1919, on the section extending from the intersection with the Canadian National Railways' line, to Bare Point at the easterly limits of Port Arthur. The work of the erection of the poles was first started on the section from Everant to Pearl on June 2nd, 1919, and the erection of the conductor on the same section on October 6th, 1920. The whole line was in operation on the 20th of December, 1920.



A view of the Nipigon Transmission Line

The main transmission line is 70.36 miles long, and has 1,124 wooden poles. It is designed for 110,000 volts with 4/0 B&S steel-reinforced aluminum conductor and C.P. 2133 O.B. 12464 insulators. The telephone wire is 3 x 13 galvanized steel, and the ground cable 9/32 inch galvanized steel. The line from Nipigon junction to Sprucewood junction and the Nipigon Fibre and Paper Co. is 110,000 volt wood pole construction, 6.67 miles long, with 111 poles. The sizes of conductor, telephone wire and ground cable are the same as in the main transmission line, the type of insulator being C.P. 2133.



BETTER MERCHANDISING

Some Suggestions from the West

By S. H. EXCELL,
Vernon City Superintendent

1. In my opinion many of the electrical appliances offered for sale suit only the well-to-do class. Prices and designs are too lavish to attract the average artisan or salaried worker who, after all, are in the majority in point of numbers. There must be an enormous waste in conducting some of these selling campaigns. Who pays the overhead but the ultimate consumer, who may be only a very small percentage of those actually canvassed?

2. Why stick to the thirty gallon water tank adopted by the plumbing trade? Let the electrical industry find out that the 12 gallon tank is ample for the average medium household. My motto is,—"Better 12 gallons of good hot water than 30 gallons only moderately warm."—Hot water can always be tempered down and there is no waste; while the installation costs and operating are kept more reasonable.

3. Encourage the time payment system on ranges. The average man is penalized by having to cash up or down to the tune of from $200.00 to $300.00 for a range installed. The average man's bill is paid as promptly as that of the well-to-do. The cash down system is a heavy penalty on plant operation, and plant factor.

4. The range and water heater manufacturers should co-operate in investigating, and advising the trade, just what is the most economical system for connections to their apparatus. Some plants are 3 wire, others 2, and connection cost is really part of appliance cost.

5. A cheap, but highly efficient street lighting unit, is much needed for small towns. The average goose-neck fixture is quite useless, where trees are on the streets; and the suspended type of fixture has been designed, and priced, for the larger cities, or does not suit in hilly districts.

What Determines The Consumer's Choice?

The Dealer is the Determining Factor in the Sale of Appliances— A Buyer's Market Exists at the Present Time and Appliances Have to be "Sold"—Hence the Necessity for "Selling" the Dealer

When the housewife is making up her mind to buy an electric washer or cleaner or other electric appliance, what or who, is the deciding factor in determining her choice?

There are three main influences: (1) Advertising in newspapers and popular magazines to reach the public; (2) The opinion and advice of friends and acquaintances and (3) The advice and backing of the electrical merchant.

The question every manufacturer and wholesaler wants answered is; which is the most important of these influences Which one dominates the other two? Let us investigate.

Consumer Advertising

No one doubts the value of a well set up advertisement in a popular magazine in creating an interest in any certain appliance. The reader looks it over and says to herself,—"That sounds fine, just what I want"—but she also adds mentally, if not audibly. "I wonder if the statements are all true. Advertisements do exaggerate matters so much at times. I know what I will do, I will ask my dealer about it."

The advertisement therefore, does not sell the appliance, it simply sends the customer to the dealer with the question —"What is your opinion about Blank's washing machine? I like the look of it. Would you advise me to get one."

The Influence of Friends

The influence of neighbors and friends, who have used the same appliance, is very considerable. This influence, however, is general rather than specific. It is difficult to say why, but while one woman may take the advice of another as to buying a washing machine, she follows her own inclination as to the type. It may be a feeling of independence or of jealousy. "Mrs. So and So's machine is all very well for her but I want something a little more complete, or Mrs. Brown's machine is too elaborate for common folks, and I think another will do just as good work for less money." Think out an explanation of this if you can but you will have to admit it is a fact.

The Dealer the Determining Factor

Now we come to the dealer. What is his influence in determining the choice the housewife makes? He says to the housewife: "We have made a careful study of the different machines—have seen them all. There are many good ones, and the one you mention would give you good satisfaction, but we have a machine here that we consider is superior in a number of ways. We like this and this and this. Here is a feature that protects you against bodily injury, and so on. We stand back of this machine, guarantee to keep it in working order, guarantee satisfaction or return your money."

Here we have the answer to the question—What is the determining factor in sale of an appliance? In 99 cases in 100 it is the dealer himself—the dealer who has first been "sold" on the merits of the machine he carries.

During the last few years manufacturers of practically every type of machine have spent large sums of money on "consumer" advertising. John Smith & Co., have advertised their washer as the best; James Brown & Co., have advertised **their** washer as the best, and so on. The result has not been satisfactory. It has befuddled the minds of the general public, who are entirely incapable of making a choice between the claims of the different manufacturers. If the same effort had been expended in "selling" the dealer on the merits of any particular machine, guaranteeing him such a profit that it would pay him to carry on a bigger sales campaign, the results would have been very much better.

If the manufacturers and jobbers feel called upon to go after the public direct then the form the publicity should take ought to be of an entirely general nature—the merits of washing machines in general, or ironing machines in general, of water heaters in general, and so on. We believe it is time for a right about face in the methods of publicity in the electrical industry. We firmly believe it is the dealer who needs backing to go out and get business, and that the thought that the consumer can either be pulled or shoved into a store to buy a certain make of appliance is not borne out by facts.

Speaking recently before the American Association of Advertising Agents Mr. Charles G. Phillips, President of the Dry Goods Economist Group of New York City has some interesting things to say: one of them runs as follows—"Good advertisers know today that the retail merchant in the dry goods field is the man that has the business in his hand. Dealer's influence is now made the universal basis of selling and advertising because it is the key note of the selling of merchandise in the dry goods and textile field.

The dry goods trade is as old as the world itself and surely the electrical industry cannot do better than profit by their experience. Mr. Phillips goes on—"The retail merchants' prime service is not the service of distribution—the filling of orders that people come in with. It is the service of selection. He is the most powerful influence in his community."

He illustrates this point. "A woman wants a new dress. On the club-house porch, or at the theatre, or in a magazine, she sees the kind of dress she wants. May be she decides it will be of silk. She determines on blue silk, and approaches her dealer.

'Something in a little stripe or a little figure. There now I like that very much. What is the price'.—The transaction is done.

She doesn't know and does not care who made the silk, She trusts her chosen merchant."

Mr. Phillips concluded his address in the following words —"I know a number of big advertising accounts which have been cut in half, but the business papers' appropriations were doubled because it is no longer a seller's market. We are in a buyer's market and sales effort is necessary. The fundamental purpose in advertising is to help sell merchandise. If ever there was need for the re-establishment of good, solid, honest contact between manufacturers and their distributing machinery, now is the time."

A buyer's market—that applies to the electrical industry in an intensfied degree. The public does not buy electrical appliances as it does groceries—from necessity; it does not buy them as it buys candy or confections—from desire or habit. Every electrical appliance has to be "sold" and the only individual who can sell it is the electrical dealer. Until and unless we develop our electrical dealer class, enthuse him with the merits of the equipment he handles, give him a good profit and stand back of him with an absolute guarantee of support, we can advertise to the ultimate consumer until all our money is gone and we shall still be marking time, and wondering why the electrical industry does not make headway.

The electrical merchant is at the same time our greatest need and our biggest problem. Do not let us split up our limited resources. Let us concentrate at the point that gives greatest promise of results.

The Radio-telephone Fire Hazard

Specifications Regarding the Installation of Receiving Sets From The Dominion Fire Commissioner

Editor, Electrical News.

With thousands of radio sets now in use throughout Canada—the majority of them in private homes—and with the ranks of the "listeners in" swelling from week to week, all records for the popularity of scientific invention have been eclipsed. And like many other inventions, radiotelephony has introduced a new fire hazard. One of the fire dangers lies in the inclination of those interested to experiment with lighting circuits and other high voltage systems. Another is the hazard arising from lightning. To mitigate, as far as possible, these dangers, the specifications that follow were drawn up by a special committee including representative engineers. This committee places itself on record as considering stations making use of in-door antennae devoid of hazard. Emphasis is also placed upon the fact that most of the fires so far reported as originating with wireless sets, have arisen from lightning brought in from over-head antennae.

J. Grove Smith,
Dominion Fire Commissioner.

The following radio telephone safety rules, applying only to receiving stations, are extracts from a complete set of specifications that have been approved by the Dominion Fire Commissioner:—

Antennae

a. Antennae outside of buildings shall not cross over or under electric light or power wires of any circuit of more than six hundred volts, or railway trolley or feeder wires, nor shall they be so located that a failure of either antennae or of the above-mentioned electric light or power wires can result in a contact between the antennae and such electric light or power wires.

Antennae shall be constructed and installed in a strong and durable manner and shall be so located as to prevent accidental contact with light and power wires by sagging or swinging.

Splices and joints in the antennae span, unless made with approved clamps or splicing devices, shall be soldered.

Lead-In Wires

b. Lead-in wires shall be of copper, approved copper-clad steel or other approved metal which will not corrode excessively, and in no case shall they be smaller than No. 14 B. & S. gage, except that approved copper-clad steel not less than No. 17 B. & S. gage may be used.

Lead-in wires on the outside of buildings shall not come nearer than four (4) inches to electric light and power wires unless separated therefrom by a continuous and firmly fixed non-conductor that will maintain permanent separation. The non-conductor shall be in addition to any insulation on the wire.

Lead-in wires shall enter building through a non-combustible, non-absorptive insulating bushing.

Protective Device

c. Each lead-in wire shall be provided with an approved protective device properly connected and located (inside or outside the building) as near as practicable to the point where the wire enters the building. The protector shall not be placed in the immediate vicinity of easily ignitible stuff, or where exposed to inflammable gases, or dust, or flyings of combustible materials.

The protective device shall be an approved lightning arrester which will operate at a potential of five hundred (500) volts or less.

The use of an antennae grounding switch is desirable, but does not obviate the necessity for the approved protective device required in this section. The antennae grounding switch if installed shall, in its closed position form a shunt around the protective device.

Protective Ground Wire

d. The ground wire may be bare or insulated and shall be of copper or approved copper-clad steel. If of copper, the ground wire shall be not smaller than No. 14 B. & S. gage, and if of approved copper-clad steel it shall be not smaller than No. 17 B. & S. gage. The ground wire shall be run in as straight a line as possible to a good permanent ground. Preference shall be given to water piping. Gas piping shall not be used for grounding protective devices. Other permissible grounds are grounded steel frames of buildings or other grounded metallic work in the building and artificial grounds such as driven pipes, plates, cones, etc.

Wires Inside Buildings

e. Wires inside buildings shall be securely fastened in a workmanlike manner and shall not come nearer than two (2) inches to any electric light or power wire unless separated therefrom by some continuous and firmly fixed non-conductor making a permanent separation. This non-conductor shall be in addition to any regular insulation on the wire. Porcelain tubing or approved flexible tubing may be used for encasing wires to comply with this rule.

Receiving equipment Ground Wire

f. The ground conductor may be bare or insulated and shall be of copper-clad steel or other approved metal which will not corrode excessively under existing conditions, and in no case shall the ground wire be less than No. 14 B. & S. gage except that approved copper-clad not less than No. 17 B. & S. gage may be used.

The ground conductor may be run inside or outside of building. When receiving equipment ground wire is run in full compliance with rules for Protective Ground Wire in Section d., it may be used as the ground conductor for the protective device.

Radio Fees Change

The Dominion Government has made several revisions in the annual fees charged for the operating of broadcasting and receiving radio sets. The fees to be paid in respect to examinations for certificates of proficiency in radio telegraphy and radio telephony have also been revised.

The following is the revised list of fees:

Limited coast station, $50; public commercial station, $50; private commercial broadcasting station, $50; private commercial station, $10; experimental station, $5; amateur broadcasting station, $5; amateur experimental station, $1; private receiving station, $1; technical or training station, $5; ship station, $1.

Revised fees for examination are as follows:

Extra first-class certificate, $5; first-class, $2.50; second-class; $1; third-class, $1; experimental, $2.50; amateur, $.50; emergency (any class), $5; radio telephone certificate, $2.50.

A Wireless Chain 'Round the British Empire

In answer to questions in the British House of Commons, Rt. Hon. F. C. Kellaway, Postmaster-General, stated that the Government, in further considering the question of an Imperial wireless chain, has decided to erect in England a station of the ultimate power contemplated by the expert commission, instead of a station with smaller power, which was first proposed. The Government, he said, was advised that this station, with its greater power, would provide especially for direct commercial communication with India, South Africa and Australia.

The Imperial Government, Postmaster-General Kellaway, said, would erect a station of similar power in India, with Indian Government work. This station would be capable of directly communicating with England, South Africa and Australia. As a corollary of this decision, the proposed second station in Egypt and a station in East Africa would be deferred, and the question of the erection of a station at Singapore and another at Hong Kong would be reconsidered.

Canadian Government experts were expected to reach England very shortly, Mr. Kellaway said, in order to discuss the question of Canada's participation in the Imperial wireless chain scheme.

Radio Merchandising Situation

The summer slump has had a pronounced effect upon the radio business. Dealers are beginning to realize that they cannot afford to carry a large and heterogeneous lot of odds and ends of radio apparatus in the hope that they will be able to dispose of it. They are learning that overstocking of apparatus in an effort to meet the spasmodic demand of radio "faddists" is not going to prove profitable in the long run. They are beginning to realize that unknown apparatus that looks good in the catalogue, may become merely an ornament upon the shelves. New and more stable merchandising schemes are being evolved, as radio apparatus no longer sells itself, and the handling of this line must of necessity become more businesslike. It should be viewed as a legitmate line of electrical or household appliance, or a musical instrument, requiring the same keen merchandising sense as any other allied line.

There was a time when the phonograph business was a fad—when even automobile selling required pretty wild methods—and of course, the radio industry must pass through the same comparative stage. But the sooner we are out of it the better off we all will be.

Quality is no longer being sacrificed for speed. The slogan "send me anything, but send it quick" has now become "send me nothing if you can't sent it right."

Beyond doubt dealers are more careful in their buying. They are learning what to look for in crystal sets, what to avoid in telephone construction, which vacuum tube outfits may be depended upon and why, and so on. The caution which has been engendered as a result of the slack in consumer buying has made the dealer more conservative than ever in his purchasing. Whereas before, he was in the habit of ordering a couple of dozen sets of various makes, without troubling himself about how they were designed or put together, now he insists on opening and examining the apparatus before ordering.

Manufacturers are learning that dealers are looking for stability and reputation before they look for apparatus, and that they want some sort of guarantee that the manufacturer will be in business when the kicks, if any, come through. Radio is like the automobile business in one respect—if you buy a car and then cannot get separate parts in case of need, your car might just as well be relegated to the junk heap. If a consumer buys a radio outfit and then seeks separate parts to make a new circuit with or for additional installations, he will not be easily calmed if his dealer says, "Sorry we can't oblige you, but that manufacturer went out of business last week." The buyer feels that it was up to the dealer not to sell him stuff made by a manufacturer who goes in and out of business over night.

Radio Set for Saskatchewan Department of Telephones

The Saskatchewan Department of Telephones is having a set of aerials for wireless telephony constructed on the roof of the Parliament Buildings. The installation is well under way and will be in operation in a short time. The department, it was stated, is installing the system as an experimental measure, with the intention of keeping in practical touch with developments of this up-to-date method of telephonic communication, and it is understood that the use of the installation will, for the present at any rate, be confined to departmental purposes.

Fred E. Garrett, Western Representative

A recent test conducted by shipping board representatives at a western port, to determine the most efficient and economical method of handling communication between points gave the honors to radio. The traffic costs were between 40 and 50 per cent. less using radio communication. The result is that most of the coastwise traffic is now being given to the radio circuit.

Exhibit of the Lincoln Meter Company

Through an oversight, mention of the exhibit of the Lincoln Meter Company at the recent convention of the A. M. E. U., was omitted from our issue of July 15. Their display included graphic measuring instruments—one measuring volt-amperes and one measuring watts—indicating demand instruments and split-core transformers.

Radio Tower at Prince Rupert

Mr M. J. McNeill, Prince Rupert, B. C., owner of the Central Hotel, is erecting a combined radio and observation tower, valued at $2,600, for the use of hotel guests.

Dominion Convention of Contractors and Dealers

A Dominion Convention of Electrical Contractors and Dealers will be held in Toronto on November 13th and 14th.

Messrsc Nelson & Hawkins, late of the staff of Beattie—McIntyre Ltd., have opened an office at 99 Adelaide W. Toronto. They will carry on a general electrical lighting & power installation business, wiring and repairs.

The Ontario Gazette announces the incorporation of the Wentworth Radio Supply Company, Limited, for the purpose of manufacturing, buying and selling radio equipment, etc. Capitalization $100,000. Head office, Hamilton.

The Canada Gazette announces the incorporation of The Dubilier Condenser & Radio Corporation of Canada, Limited, for the purpose of manufacturing and generally dealing in all kinds of radio apparatus, etc. Capitalization $50,000. Head office, Ottawa.

The electrical industry will hear with regret of the death of C. F. McGilvray, chairman of the Board of Directors of the Robbins & Myers Company of Springfield, Ohio.

Electrical Wiring of Mount Royal Hotel

A Contract Calling for the Installation of an 18 Panel Switchboard, Several Different Forms of Signal System and Necessitating Thorough Previous Organization

Two cuts on Page 58 of this issue show two stages in the electrical wiring for the Mount Royal Hotel, now under construction at Montreal. The first, shows the method of placing electrical conduit on the forms prior to the pouring of the floor slab. It illustrates the position an electrical contractor must be prepared to assume and maintain, during the construction of a building of this type.

Immediately upon the completion of the wood forms and the placing of reinforcing steel, the electrical contractor takes possession and his organization must be in condition to keep ahead of the concrete men. On this particular contract the electrical contractors were allowed very little time and on some floors it was necessary to place over 30,000 ft. of ½ inch conduit in a week.

All conduit up to and including 1 inch is bent as near as possible to the location at which it is used. All bends were made to the radius prescribed by the Underwriters' Code by means of a standard pipe bender. This assures a standard bend for all conduit and avoids kinks and damage. Offsets and saddles were made by hickeys. All outlet boxes are kept in position by iron braces which, before pouring, were nailed to the forms. After the conduit has been installed all openings are plugged to avoid entrance of concrete, water or other foreign matter.

As all switches and outlets for lights, telephones, telegraph, telautograph, fire alarm systems, etc., must be in the exact location, the electrical contractor must have a mental picure of the interior of the building as it will appear when completed, in addition to a complete knowledge of plans. This is necessary to avoid changes which might be necessitated after the concrete sets and the forms are removed.

The second cut, on Page 58 shows the conduit and outlet boxes in place, after the pouring of the floor slab and the removing of the forms. The floor is now ready for partitions and the necessity of having outlets in proper position is clearly indicated. The expense of making changes at this stage of the work is obvious.

Partitions and door bucks will now be placedd and it is at this phase of the work that the electrical contractor discovers discrepancies if any, in location of outlets. At this time care taken in proper organization is amply justified.

On the Mount Royal Hotel contract, in order to avoid discrepancies, the electrical contractor prepared what is generally known as a buck plan. On information received from the general contractors, this buck plan showed the exact location of the centres of rooms, bedroom partitions, bathroom partitions and door bucks.

Axis lines were struck down the centre of the building and corridors. The location of every outlet was determined not only from measurements from axis line to the outside steel but was also located by measurements running from the outside steel back to the different axis lines. This system was carried out in all directions and as the figures were given in both directions on the buck plan, considerable saving of time installing the work was permitted. It afforded a very carefull check on all locations in addition to minimizing incorrect positions. When the fact is considered that two receptacles and two switch boxes were placed back to back in the 3 inch partition, the value of this procedure can be readily seen. All dimensions on the buck plan were made additional; that is, if the first room partition was 12 feet 6 inches from the centre of steel and the second room 14 feet, instead of showing 12 feet 6 inches and 14 feet respectively, the first dimension was shown 12 feet 6 inches and the next dimension 26 feet 6 inches.

The entire electrical installation is being performed by the Canadian Comstock Company, Limited, of Montreal and Toronto.

The Electrical Contract

The complete electrical work, consists of the installation of an 18-panel main lighting and power switchboard in the basement, a sub-panel switchboard in the pent house and 8 power distributing panels in different parts of the building, together with conduit and wiring systems for power, lighting, fire alarm, carriage calls, time-clocks, time-stamps, telautograph, telephone, telegraph, watchman's system and miscellaneous low tension apparatus.

The current for power, which is 230 volts d.c., will be generated in the basement by 2 200 volt synchronous motor-generators, and a steam driven generator to be used in case of emergency. The lighting will be 230-115 volts and in general a.c. but the system will also be arranged to be operated from the d.c. bus-bars.

Each bedroom will have a ceiling light for general illumination, controlled by a local switch at the entrance to the room, three base plugs for local lighting and one telephone plug. Each bathroom will have a bracket light over the washbasin and cabinet, controlled by a local switch at the bathroom door, and a heater plug for heating appliances at the side of the washbasin.

The lighting in the main lobby, palm room, main dining-room, and ball and banquet rooms will be controlled by push buttons operating remote control.

A Correction

Through a shipping error, the wrong plate for the A B C washing machine advertisement reached us and appeared in our July 15th issue. The error was discovered just after we had gone to press—too late to correct it. As a result, you will have noticed in this advertisement (which was entitled "A Three Hundred Thousand Dollar Trainload of A B C Electric Washers") the fact that the United States prices were quoted and that the addresses of the Canadian distributors for Altorfer Bros. Company were omitted. In this issue, on page 9, the advertisement is printed as it should have appeared in the July 15th issue.

General Electric Acquires Canadian Edison Company

Effective August 1st next, the Canadian General Electric Company, Limited, will acquire all the interest in the Canadian Edison Appliance Company, Limited, of Stratford, and the latter company ceases to exist as a separate corporation. Mr. R. S. Morgan, secretary-treasurer of the Canadian Edison Company, made the above announcement recently.

The controlling interest in the Canadian Edison has been held by the Canadian General Electric Company since its inception, the present change merely being that the shares held by the Edison Electric Company, of Chicago, have now been acquired, and the plant becomes an entirely Canadian concern.

Central Station Merchandising

A Central Station Appliance Department Acts as a Goodwill Builder Between the Branches of the Industry*

Recognizing the merits of previous reports on buying and selling of electric merchandise stock accounting shop management and operation and kindred subjects which now make excellent reference manuals, the merchandise sales bureau has this year centered its efforts on broader subjects of vital interest to all engaged in the appliance industry. During the past two or three years there has been conflict of ideas on merchandise policies and on the mediums of distribution for electric merchandise. There has been much discussion of whether the central station should stay in the electric merchandising business.

We sense a growing tendency toward the belief that central station companies are the logical ones to sell and promote the use of electrical devices. Outside of the question of the value of electrical devices as load builders and goodwill builders for public service electric companies, it is generally conceded that the capital necessary to carry on the work on a proper scale, the standing of the central station in the community, and the natural inclination of the public to expect all part of the electric service to be guided by the central station company, make central station leadership in electric merchandising, or at least electric merchandising promotion, a particular function.

In presenting our report we assume this point of view and are inclined to believe that in communities where central stations carry on an electric merchandise business on principles of fair competition with other electric dealers, that a healthier business condition for the other dealers results, and the per capita use of electric devices is greater than where that policy does not exist.

The work of the bureau was divided into five divisions; central station merchandising service, electric cooking and heating, relation with manufacturers, standardizing and testing, and sales promotion.

Central Station Merchandising Service

Assuming that central station leadership in the selling or promotion of electric devices is of paramount importance, a Division on Central Station Merchandising was formed.

This division has promoted the idea of having extensive tests made by central station companies of the association to ascertain the value of appliances as load builders and income producers. Results so far obtained by a score of companies indicate that a substantial percentage of residential income is derived through the use of household devices and that sales activity, or promotion to place them in the hands of service customers, is most important. The action of companies along these lines is further justified by the goodwill building value, giving closer contact with the customer and broadening the meaning of electric service. The lighting bill as such is giving way to the electric service account.

The purely selfish motive which would promote appliance distribution on a non-competitive basis has now gone into the discard, and we find merchandising profit as a goal gaining rapidly in favor of the leading companies. We find that a central station appliance department operated as a profitable merchandise business has gained favor as a goodwill builder between the branches of our industry and is productive of healthier retail distribution.

We maintain therefore:

1. That central station leadership is a benefit to the company, to the trade, and to the public.

2. That the needs of the public demand intelligent advice from the public service company on various types and qualities of electric products.

Relation With Manufacturers

The value of any electric device lies in the service it gives. It may or may not be adequate for the work it is supposed to accomplish. If it does not give service, the customer places direct blame on the dealer rather than on the manufacturer. Maintaining the device in service is both a manufacturer and a dealer problem.

Selling the idea of a particular electric service given through an electric device, sales methods in getting devices to the cusomers, and advertising in connection with them, are all problems of the dealer and manufacturer or his agents, the jobber.

They are common problems for dealers and manufacturer and they should be in closer co-operation. To this end we had this year a committee of manufacturers as a part of the executive committee of the bureau. We have not functioned effectively nor produced definite results. The seed has been planted, however, and we feel that it will bear fruitful results at a later date.

The question of discounts, one of the most complex with which we have to deal, has been under discussion. A wider spread for the dealer to cover his large handling charges is essential, especially in demonstrated articles such as washing machines, ironers, vacuum cleaners, etc. We believe that there is merit in the fundamental idea that quantity purchase should be the basis of discount. We realize, however, that discussion of the question is not relevant here, and that the entire subject with its ramifications is one for careful study.

At this time the bureau wishes to commend the Vacuum Cleaner Association for its broad, progressive action, and its effort to sell a great electric idea to the public through local newspapers of the country.

Standardizing and Testing

It seemed desirable to continue this year effort toward producing durability in devices, and to encourage and promote the testing of appliances at some central source.

The committee having this work in charge has met with handicaps but tests are still being conducted through the Electrical Testing Laboratories. For the first time an informative exhibit covering this work is a part of the general convention exhibit.

The standardizing of cords and plugs has progressed, a marked feature being the adoption of the standard split socket plug by some of the larger portable lamp manufacturers. Much remains to be done in connection with the checking of durability of cords. The problem is complicated by the wide range of treatment a cord receives in actual service by the individual user. Plans are now being devised to continue practical tests on the basis of home service requirements.

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*Report of the N.E.L.A. Merchandise Sales Bureau.

Progress must necessarily be slow but we are heading in the right direction. The value of an appliance is in the service it gives the owner, the efficiency of that service and durability under service.

We maintain that superior quality will ultimately be the goal of all manufacturers of electric devices, both by reason of the demand of the public and by reason of necessity of maintaining guarantees.

There will be a market for goods of lower grades, but value for value should be obtained, and misrepresentation by any manufacturer will not only react in general disapproval of the consumer market for electric service through these devices, but will likewise react in the automatic elimination of the manufacturers who misrepresent.

All central stations in the country should be informed on the merits of the devices which they sell or promote and stand as a protection to their customers for the reason that they must protect their electric service.

Electric Cooking and Heating

It seems that this subject is ever new. The electric range for domestic use is showing marked development; the industrial cooking message is spreading; commercial cooking devices, bake ovens, etc., are making sure progress and together they open up a field for rich returns. We can be most optimistic.

The essentials for building a cooking load are (1) a rate that will better the business, (2) an engineering department familiar with the characteristics of a range load, and (3) an organization sold on the merits of electric cooking.

Certain fundamental handicaps exist in large communities to the building of an electric cooking load, but these we believe will be eliminated at the opportune time. Because such handicaps do exist need be no disparagement to the central stations who are ready. To them the report of the division this year is addressed. Electric cooking is here to stay. The sales promotion methods representing the experience of central stations that have successfully sold electric ranges are represented herewith. The essential of selling the company organization is carefully considered and methods recommended for its accomplishment.

In connection with the servicing of ranges it is interesting to note that one large company that has developed a considerable range load has over a period of years reduced its average cost per service substantially, the reduction coming about notwithstanding the rise in cost materials. Can there be more convincing indication of the point of view that must be taken in building a range load? Service supply costs must be reasoned over a period of years rather than on cost during early development.

The report of the division brings out evidences of the off peak nature of the range load. This is most important in justification of a rate and in the matter of station capacity. Information on the varying diversity factors in range loads is most important in the discussion of service supply, and we find that because of the widely diversified habits of home life and in cooking that diversity of factors of ten to one and even fifteen to one are not uncommon.

It is of further interest to note that a study of transformer loads brings out that the electric range customer is always a very much higher electrified customer in every way than one not sold on the electric cooking idea.

Our report in connection with the subject of electric cooking and heating would not be complete without impressing the thought of the value of extending the promotion of cooking into companies that have a fair start in the domestic field are already at work. Every hotel, restaurant, hospital and like institution and all bakeries offer opportunity for heavy duty equipment, at least bake ovens. The load is highly desirable. The income is sure and the service given will be appreciated.

Recommendations are offered by the division in connection with electric cooking development which affect all branches of the industry.

Sales Promotion Division

The sales promotion division was formed to study sales organization and sales methods for the distribution of electric merchandise. Also to devise plans for selling the electric idea and increasing thereby the retail market for various groups of devices. The work included the advantages for co-operation between manufacturers and dealers, central stations and contractors. The deliberations of the division were in progress when the great broad business development movement started in our association which included the purposes of our sales promotion plans in broader scope. Instead of duplicating effort it seemed better to assist and no report of the division is submitted. For sales promotion recommendations we are pleased to make reference in this bureau report to the synopsis of the joint committee on business development—appliance section.

Recommendations

The bureau would go on record with the following recommendations to central stations:—

1. That the merchandise department be operated on strictly cost principles.

2. That friendly contact with progressive dealers and contractors in periodic sales and promotion work be a part of the operating program of the merchandise department wherever desirable.

3. That all central station companies that have not made tests for ascertaining appliance load, check up with the findings of other countries either to disprove or to be convinced of the income producing value of electrical devices.

To the manufacturers we recommend:—

1. That quality and durability be kept an essential in the building of devices and that the problem be studied for giving better and prompter service at lowest cost.

2. That the manufacturer make careful study of the advantages of national advertising versus local advertising and sales effort, and the desirability of local co-operative newspaper advertising with the dealers.

3. That the cooking schools of the country, public and private, and institutions of learning offering domestic science courses be given careful attention by the manufacturers as an advertising medium. We feel that they are not generally sold on the electric housekeeping idea, and yet they are not only turning out the future housekeepers of the country, but the students are practicing their school knowledge in the home. They are not taking with them the electric cooking message.

To the contractors and all other dealers we recommend that earnest effort be made to keep repair costs as low as possible and help create confidence in electrical devices.

We suggest to the merchandise sales bureau for the coming year that as it has the commercial and industrial field as a part of its organization a committee of manufacturers consisting of a representative or representatives of the washing machine association, vacuum cleaner association, heating device manufacturers, etc., to meet with the executive committee as often as expedient for the discussion of mutual problems.

The bureau this year for the first time has a booth in the convention exhibition and we believe that the information shown in the charts, graphs, and tabulations exhibited have informative value for all those interested in electric merchandising. Our chief purpose is to bring out the load building and income producing feature of domestic and industrial devices.

Attention is likewise called to the exhibit of the Electrical Testing Laboratories representing a part of the work of the division on standardizing and testing of our bureau, and showing the nature of the tests being made to establish durability and efficiency of certain types of devices on the market. This is likewise an innovation.

Conclusion

The various phases of electric merchandising have been well covered by discussion and reports. Each year brings new problems and this year is no exception. The transition period has brought knotty problems in electric merchandising for the manufacturer and jobber and central station, and as we view the appliance situation today, we see problems needing particular attention. We refer to the coming of cheap devices from foreign markets; the impossibility of some of our manufacturers to ride the gale of over production, depleted finances and the result on our market; the uncertainty of substantial retail outlets; the ever present differential problems, and the present weakness of the buying market.

The last is now to receive the heroic treatment it needs. The buying pendulum swung high and in its backward sweep seemed to leave its arc and come to a dead stop. It will soon be put in normal swing and in our opinion, the work of the merchandise sales bureau for the coming year should be to aid in every way possible business development work. Business normal once again will go far in solving the serious problems of today.

Signal Sales Managers' Convention

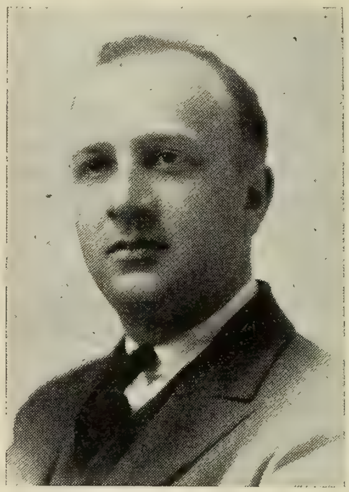
The first annual sales managers' convention of the Signal Electric Manufacturing Co., manufacturers of a complete line of high grade radio appliances as well as bells, medical batteries, etc., was held in Menominee, Michigan from June 26th to 29th inclusive. It was a 100% convention in view of the fact that everyone of the District sales managers in the United States and Canada were present. It was in every sense also a business convention, as from six to nine hours each day were devoted to the discussion of the problems relating to the production of appliances so as to meet the ever-changing and growing demands of the market. While the problems affecting the various sections of the country were in many cases of a local character, the co-operative spirit in which the meetings were conducted by the general manager, Charles E. Hammond, resulted in highly constructive results. The delegation made a careful inspection of the plant which was established and built in the year 1905, but is to-day one of the best equipped plants in the country. Modern automatic machines were shown to the delegates and they were greatly surprised at the additions to the plant which have been planned, some of which are now being constructed. It was concluded at the sessions to greatly enlarge the Signal line and make it one of the most complete high class lines of radio on the market. Among the managers was Mr. A. Ross Osborne of R. E. T. Pringle Ltd.

An Organization Program for Western Canada

Representatives of the Society for Electrical Development, and of the National Association of Electrical Contractors and Dealers in the persons of Kenneth A. MacIntyre for the Society, and Laurence W. Davis for the Association, have arranged for a tour of Western Canada and the United States. Their first six meetings will be held in Canada as follows: Fort William, July 31st.; Winnipeg, August 1st.; Regina, August 3rd.; Calgary, August 8th.; Vancouver, August 14th.; Victoria, August 16th.

Mr. Stephenson to Vancouver

Harry C. Stephenson, of Cochrane Stephenson & Co. Ltd., Winnipeg, left for Vanvouver on the 4th July, where his firm intend to open an office, which will be under his management. Mr. Stephenson was accompanied by E. G. Hohs, assistant general salesmanager of W. H. Banfield and Sons, and it is their intention to call on the trade between Winnipeg and Vancouver. Mr. Cochrane will remain in Winnipeg and look after Manitoba and Saskatchewan territory, while the Vancouver office will take care of Alberta and B. C. Announcement of the Vancouver address will be made in the near future.



Mr. Harry C. Stephenson

Convention Committee of O. A. E. C. D.

The initial meeting of the Convention Committee which has in charge the November convention of the Ontario Association of Electrical Contractors and Dealers met on Monday July 17th, and appointed chairmen of sub-committees. The following chairmen were appointed: finance—C. S. Barthe; publicity—H. H. Rimmer; papers—Frank T. Groome; entertainment—Bert Balch; reception—George Cross; hotel arrangement—C. H. Hopper; registration— E. A. Drury, and badges—H. R. Johns.

Convention Headquarters will be at the King Edward Hotel, Toronto; the dates November 13th, and 14th.

J. H. Schumacher, secretary and manager of Schumacher Gray Co. Ltd., Winnipeg, was marrien to Miss Una Cox, at Augustine Church, Winnipeg, on June 3rd, the honeymoon is being spent at Minneapolis and St. Paul. Hearty congratulations "Schue."

W. G. Hazel, salesmanager of Robbins & Myers Co., of Brantford, was a recent visitor to Winnipeg, in the interests of his firm. He left Winnipeg for Calgary.

A Dominion Convention of Electrical Contractors and Dealers will be held in Toronto on November 13th and 14th.

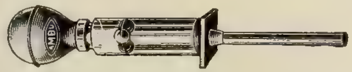
Schweitzer & Conrad Inc., 4435 Ravenswood Ave., Chicago, is distributing an interesting little folder entitled "S & C Lightning Arrester Performance."

Mr. Frank B. Chapman has been appointed Eastern Sales Manager of The Bryant Electric Company succeeding Mr. George V. W. Ingham, who has resigned. He will make his headquarters at the factory in Bridgeport.

The Latest Developments in Electrical Equipment

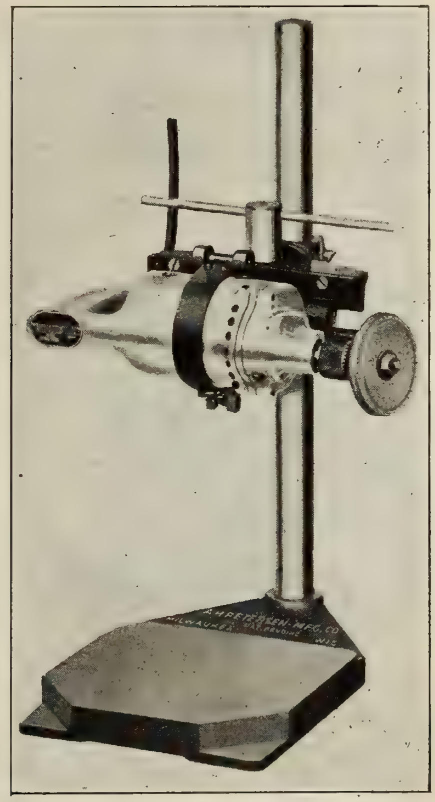
Novel Battery Tester

Car owners and radio fans would appear to be the consumers of a new battery tester being placed on the market by the American Bureau of Engineering, Inc., 2632 Prairie Ave., Chicago. The device is a hydrometer, and it is claimed that it can be read in semi-darkness; it is about six inches long and consists of a bulb, a filling nozzle of rubber, and a glass tube. Inside the tube are three colored balls, made of materials whose specific gravities differ; if the white ball sinks, the charge is still right, if the green, the charge is not full, and if the red, the charge is dead. It is claimed that the user need not know anything about battery gravities to use this tester.



"Hole Shooter" Drill and Attachments

The idea that an electric drill could be used for other purposes in addition to the drilling of holes has been carried out by the A. H. Petersen Manufacturing Company, Milwaukee, Wis., with the introduction of a portable drill with attachments. Among these are a radial portable drill-press stand, a battery terminal opener, wire brushes, a commutator saw-wheel, grinding wheels and buffers.



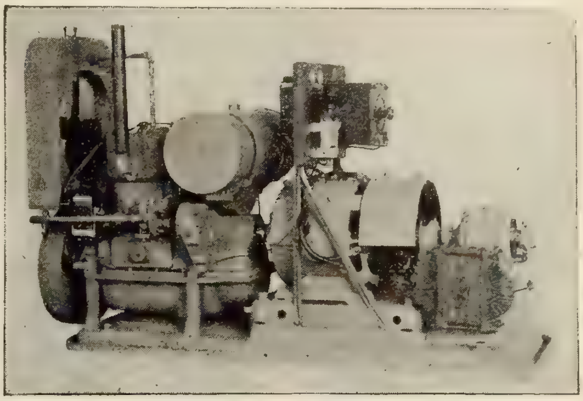
It is claimed that the stand will hold the drill rigidly at any angle, vertically or horizontally. When used in the vertical position, the combination serves as a drill press and in the horizontal position as a grinder, buffer or polisher. The complete drill-press stand weighs 30 lbs. and with the hole shooter included, 34 lbs.

The attachment used as a battey terminal opener is a lead cutting drill bit which cuts a hole 13/16 in. in diameter. Brush attachments furnished are suitable for such jobs as cleaning carbon from cylinder heads, burning metal parts, cleaning castings, sanding wood surfaces, etc.

The machine will drill up to ¼ in. in metal and 5/16 in. in wood.

Engine Driven Welding Equipment

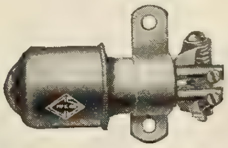
In our July 15 issue a description was given of an engine driven welding equipment for use when electric power for motor drive is not available. The apparatus was described as being equipped with a Doman four cycle two cylinder engine. The illustration herewith indicates the general arrangement as developed by the Westinghouse Company.



Pilot Lamp

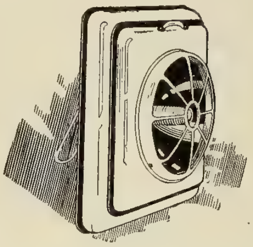
The introduction of stop signals has demontrated that there is a need for some sort of tell-tale lamp, situated in view of the driver, to determine at all times whether the rear signal is burning.

The Culver-Stearns Manufacturing Company, Worcester, Mass., have introduced a uilot lamp to meet this need. This lamp is placed in series with the company's signal lamps and thus indicates to the driver whether his tail lamp is operating. It is attached to the under edge of the dash and is thus always visible to the driver. The lamp is furnished with either a red or green jewel, and is made of brass with a nickel plated finish. Wiring diagrams are furnished, showing the method of attaching and connecting. It is claimed by the manufacturers that the lamp may be used in series with all types of rear signal lamps.



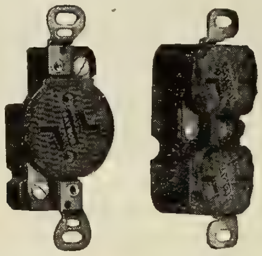
Wall or Floor Heater

A new heater manufactured by the Reznor Manufacturing Company, Mercer, Pa., is so constructed that it may be hung on the wall out of the way; this is accomplished by the elimination of the pedestal. This design embraces a device on the back for hanging to a wall and six wall nails are furnished with each heater; a folding easel is provided for standing on the floor. The heater is 17½ inches long, 16½ wide, 6½ inches deep, and weighs 14 lbs. Voltage 110, amperes 6, watts 660; for either alternating or direct current. Each heater is fitted with a 10 ampere toggle switch. Several finishes may be obtained, including white enamel, nickel, Japenese bronze, Butler silver and burnished brass.



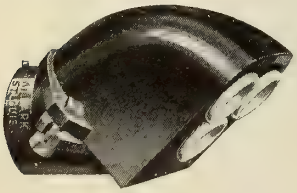
Single and Double Flush Receptacles

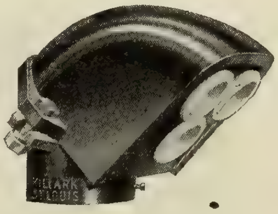
Single and double, composition, flush receptacles have been recently added to their line by the Gaynor Manufacturing Company, of Bridgeport, Conn. A point claimed for there receptacles is that they are very shallow, measuring 1 in. in depth, and allowing additional room in the metal box for making connections. Good connection is assured by the phospor-bronze contact springs which engage both sides of the attachment plug prongs. The bodies of the receptacles are made of black composition. No sealing compounds are used and the surface has a matted finish.



Conduit Entrance Fitting

The Killark Electric Manufacturing Company, 3940-48 Eastern Avenue, St. Louis, Mo., are now manufacturing an entrance fitting for 2½ in. and 3 in. conduit. The finish is either black japanned or galvanized and covers, hubs and plates are of cast iron. When the fitting is installed, it is prevented from turning on the conduit by a set screw on the hub. The manufacturers point out that the fitting may be used on either a horizontal or a vertical pipe by changing the relative positions of the hub and cover, as shown by the illustration.





A Duplex Table Outlet

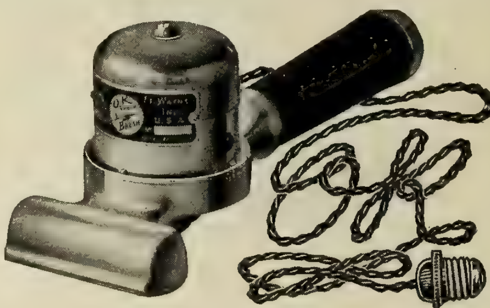
The Arrow Electric Company of Hartford, Connecticut, have recently placed on the market a device which provides two outlets for appliances—on the dining room table, office desk or wherever wanted. The outlet is nickel finished, has six feet of silk cord and a convenience plug for attaching to the source of current. The company furnishes a display carton which shows the outlet in use on a breakfast table, attachment being made to a percolator and toaster.

Three Heat Electric Solder Pot

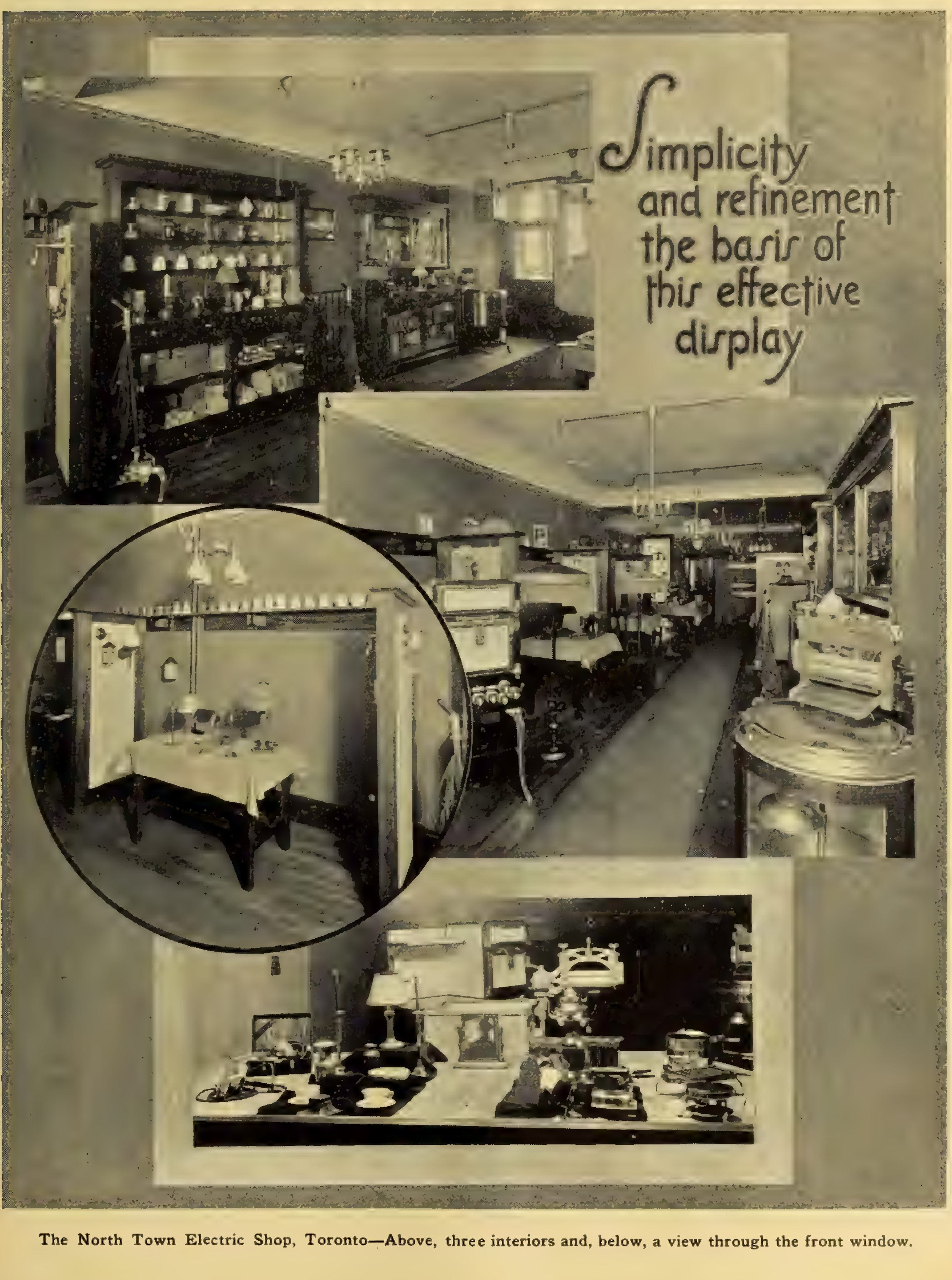
An electric solder pot that makes possible an increase in shop efficiency has been perfected by the Westinghouse company. This "Three Heat Electric Solder Pot," as the product is called, changes an immovable fixture into a portable appliance. With a gas heated pot, it is frequently necessary to carry molten metal in a ladle, but this is eliminated by the use of the electric solder pot, which can be moved from place to place and can be attached for use wherever there is electric wiring. It can also be moved, while connected, from the floor to a bench or shelf. Other advantages of this type of pot are that it decreases the fire hazard, eliminates gas odors and fumes, gives absolute certainty in the time necessary to heat a given quantity of solder, insures maintenance of the right temperature and greatly decreases metal loss by burning.

A Hand Vacuum Cleaner

The Wayne Machinery Company, Fort Wayne, Ind., are marketing a new device described as a hand electric vacuum cleaner and motor driven brush. This machine is equipped with a standard type revolving motor driven brush, and a 110 volt universal current motor. The manufactures state that the motor will operate on 220 volt direct current in series with a 60 watt lamp and on any cycle. The discharge is into a dust bag inside the handle; this bag may be cleared by removing the cap on the end of the handle, when with the motor running all cleanings are blown outside. An auxiliary dust bag is included as a regular equipment to be employed where it is desired to clean a long time without emptying.



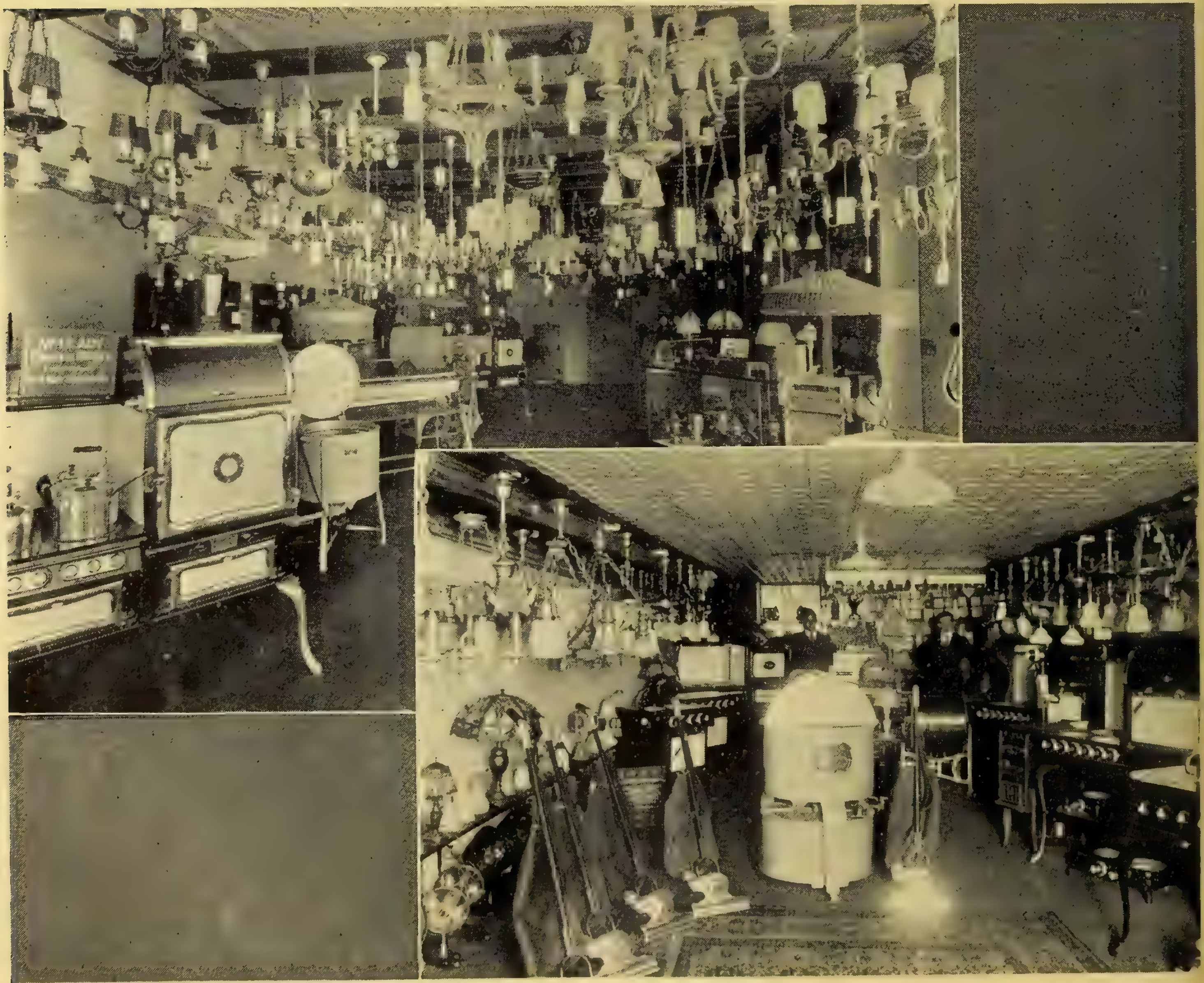
Canadian Electrical Activities, Here and There, in Picture Form



The North Town Electric Shop, Toronto—Above, three interiors and, below, a view through the front window.

They All Attend the A.M.E.U. Convention at Niagara

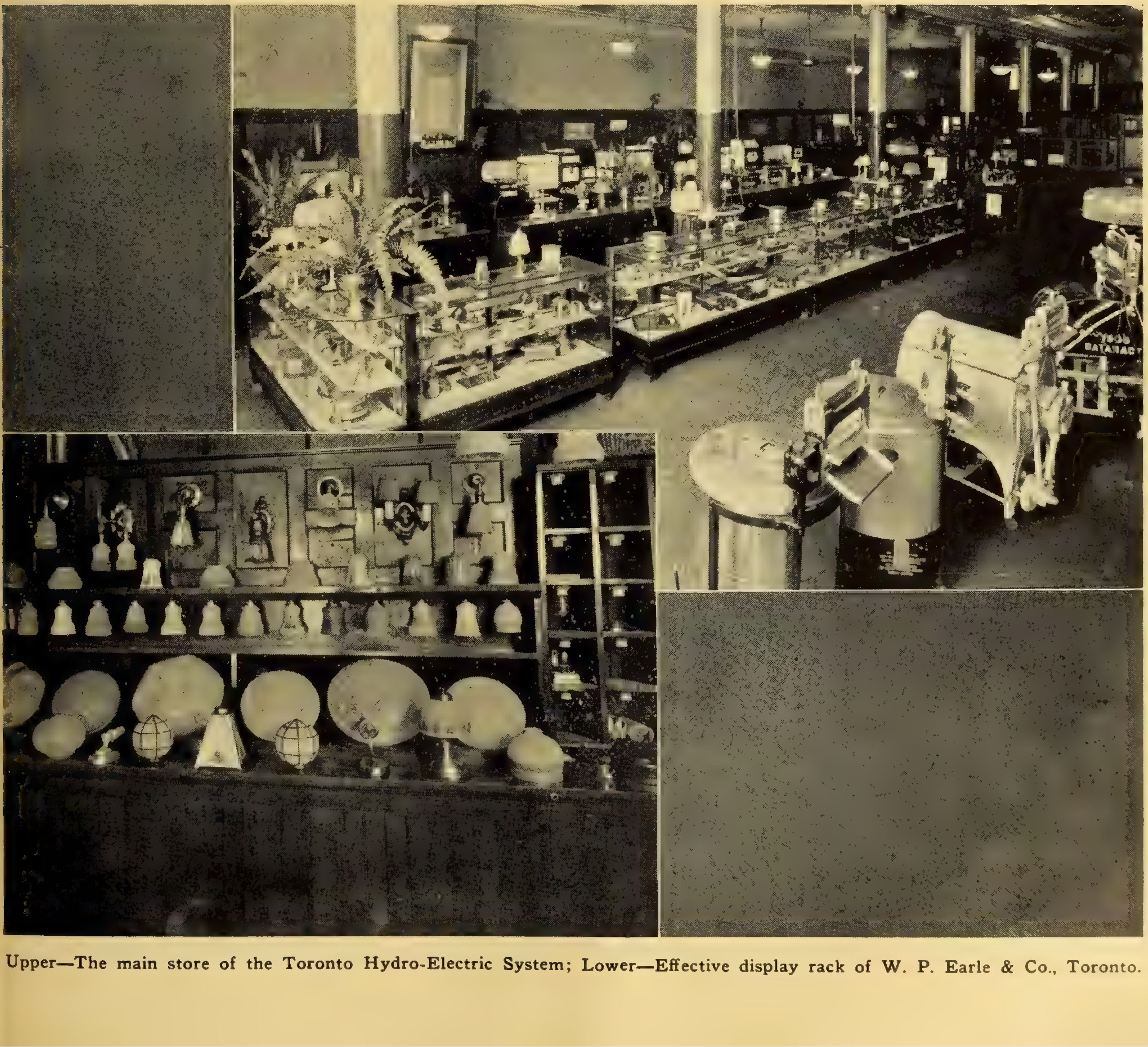
Everybody attends the A.M.E.U. Convention but it's not easy to get them all out on the



Upper—Interior of St. Clair Electric, Toronto; Below—Mattell & Bierwagen's store in Kitchener, Ont.—a contrast in arrangement.

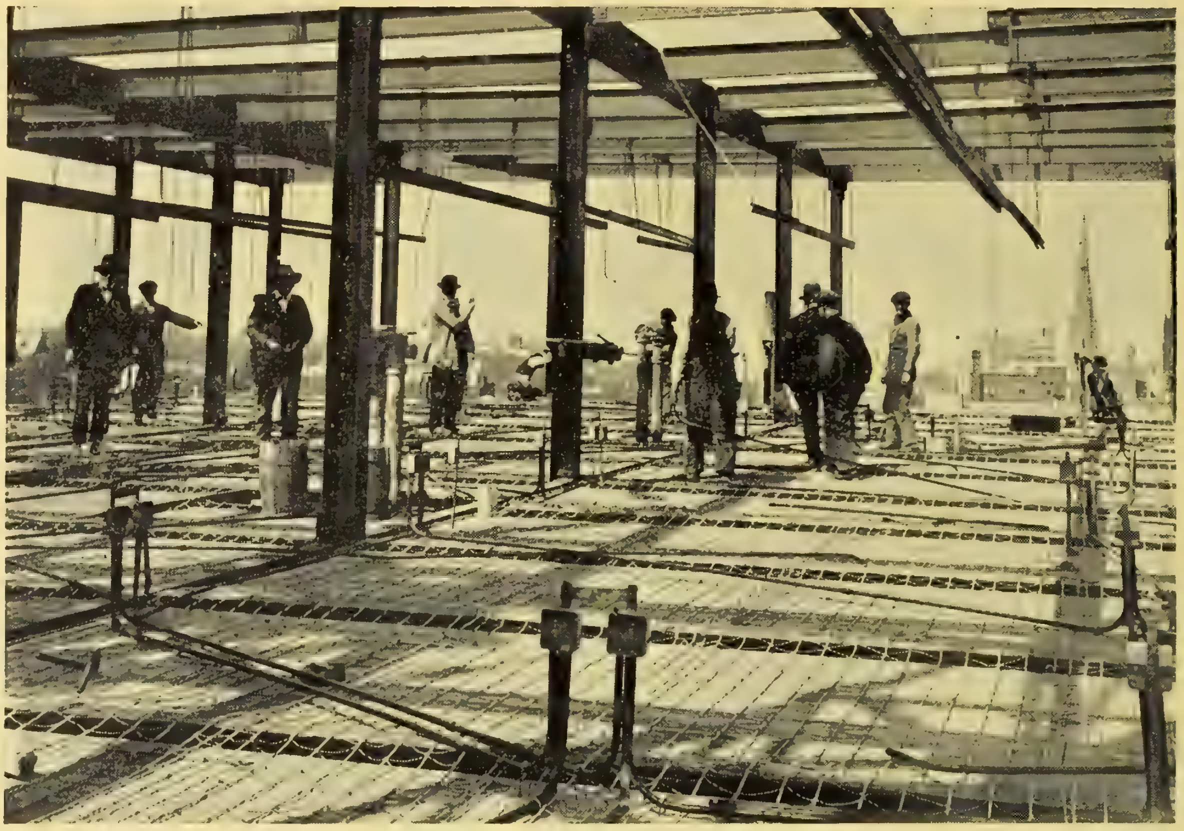
Falls-Some More Fine Electric Store Interiors

wn at the same time. They come from every town in Ontario where the Hydro is operating.

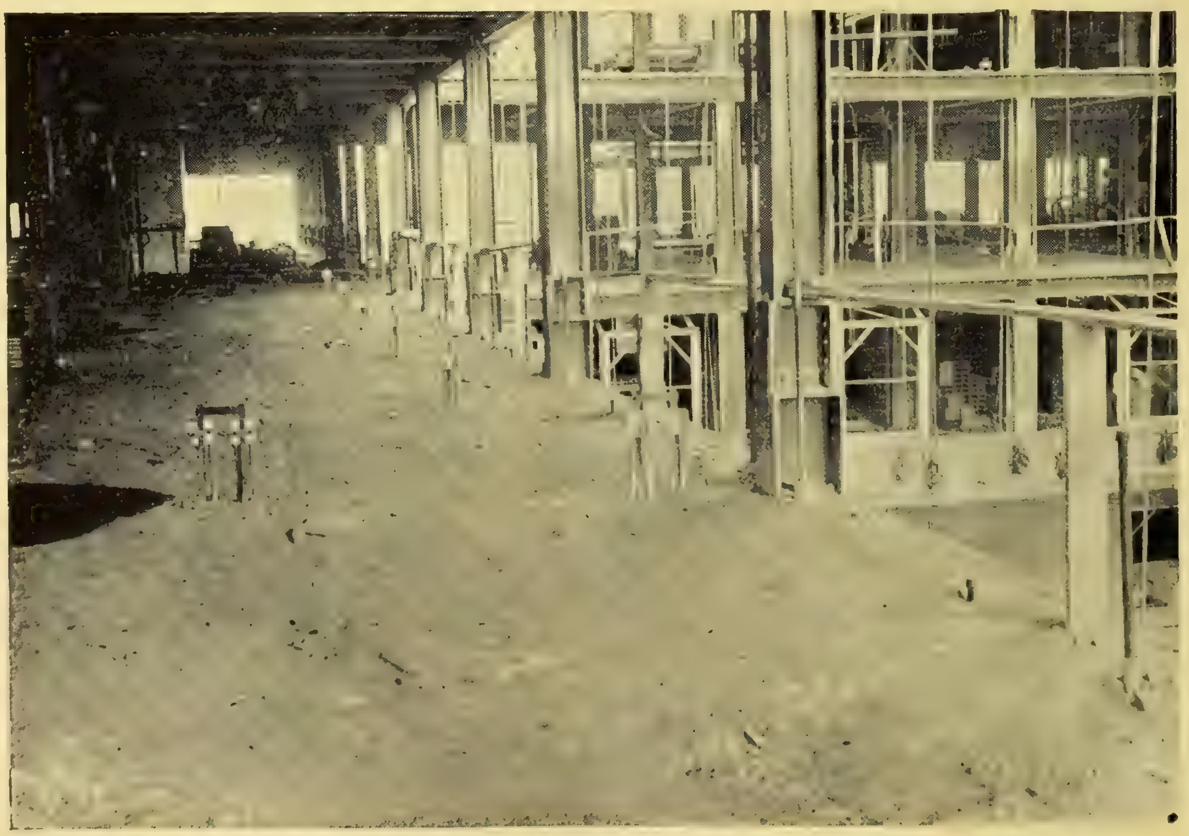


Upper—The main store of the Toronto Hydro-Electric System; Lower—Effective display rack of W. P. Earle & Co., Toronto.

Wiring Canada's Biggest Hotel



Wiring the Mount Royal Hotel, Montreal. Placing conduit on the forms prior to pouring floor slab.



Wiring the Mount Royal Hotel, Montreal. Conduit and outlet boxes in place after pouring floor and removing forms. For complete description of work see article elsewhere in this issue.

Thanks to the Trolley

Under this heading the Winnipeg Electric Railway Public Service News makes the following argument. It is logical and convincing. This form of propaganda, appealing to the intelligence of the citizens, will eventually result in a proper conception of the real relationship that exists between the citizens and their service organizations:

The home owner can say: "My property is more valuable than it otherwise would be because of the car lines which run near it."

The business and professional man can say: "My business is more prosperous because of the four million dollar pay roll of the Winnipeg Electric Railway Company."

The retail merchant and theatre manager can say: "I am able to do more business because the street railway carries my customers cheaply from their homes to my store, or house."

The wage earner can say: "I am able to live in the pretty suburbs and bring up my family amid healthful surroundings because the street car gives me quick access to my employment three miles away."

Then surely the home-owner, the business and professional man, the retail merchant, the theatre manager, and the wage earner must agree that an institution like the street railway, which means all that it does mean to them in dollars and cents, deserves their utmost co-operation and good-will.

Notice Served on Quebec Railway L. H. & P. Company

The City of Quebec has served notice on the Quebec Railway L. H. and P. Company that they must institute a five minute street car service in Belvedere ward within eight days from the receipt of the notice, and start work upon the proposed extensions on Dorchester street, and also on the Charlesbourg Road, before the 1st of August, failing which action will be taken by the City to nullify the contract.

As drawn up and served upon the company the notice contained three points. The first of these calls upon the company to institute within eight days a five minute service of street cars to the people living in the Belvedere ward, the same as is enjoyed in other sections of the city. The second calls upon the company to commence, before the end of the present month, the extension of the tramway line on Dorchester street at Stadacona, passing over the Lavigueur bridge and rejoining the existing line at the intersection of Dorchester street near the Drouin bridge. The third point calls for the undertaking, within the same specified time limit, of the extension of the line on the Charlesbourg Road from Lamontagne Avenue, a distance of some 650 feet. These extensions, it is pointed out by city officials, were to be completed in August, 1920, according to the terms of the contract entered into between the city and the company in 1919.

Circuit Breakers Up-to-Date

"Protection Up-to-Date" is the title of a publication by the Cutter Electrical & Mfg. Co. It deals in an original way with the various applications of I-T-E and U-RE-LITE circuit breakers and the reading matter is balanced with photographs of installations.

The Quebec Gazette announces the incorporation of "La Compagnie Telephone de la Riveire des Prairies, Limitee" with a Capitalization of $10,000, for construction and operations of a telephone system on different parts of the Island of Montreal. Head office, Montreal.

Rolling Contacts for Controllers

The advantages of rolling contacts for control apparatus are described in a publication known as Leaflet No. 3428, which has recently been issued by the Westinghouse Electric & Manufacturing Company, East Pittsburg, Pa.

Automatic Load Regulator for Motor-Driven Pulp Grinders

An automatic load regulator to correct the fluctuating load conditions of motor-driven pulp grinders is described in a publication, known as Leaflet No. 1934, which has recently been issued by the Westinghouse Electric & Manufacturing Company, East Pittsburg, Pa.

Scientific and Industrial Research in Canada

The report of the Administrative Chairman of the Honorary Advisory Council for Scientific and Industrial Research of Canada for the year ending March 31st., 1921, is just received. The report is signed by M. R. A. Ross, the Administrative Chairman,, but credit is given to Dr. A. B. Macallum, former chairman, for the preparation of the report. Among the items mentioned are reports by associate committees on mining and metallurgy, physics and engineering physics, air research, cold storage, food research, industrial fatigue, & etc. A special report by the chairman is included, in three sections, the first dealing with the work of the Council, the second with the overlapping and duplication of effort in scientific and technical work in Canada and the third with the "National Research Institution."

Trackage Extensions on B. C. E. R. C. Lines

For the first time in a number of years, actual trackage extensions are under way on the system of the British Columbia Electric Railway Company at Vancouver. About a mile of track is under construction on the Broadway West line, and will give a more adequate service to an already well built up and growing district.

The type of construction adopted is first class, with the heavy 8 in. rails that go with permanent pavements. Fir ties are in use, resting on about 9 inches of ballast, commencing with 3 inch stone, and finishing with about three inches of screenings. The same fine material is being used for tamping, after which a course of concrete is to be run in.

One item in which the most modern practice makes for economy is the method of bonding being used. Solid copper wire is used instead of the cable formerly in use, and connection to the rails is by welding, the oxy-acetylene process being used.

Woodstock to Tax Bus Lines

Bus lines operating between Woodstock and Ingersoll which do not travel under the rules and regulations applied to taxis, will have to pay taxes like the Woodstock, Thames Valley and Ingersoll Railway. This was contained in a by-law passed by the police commission of this city following recommendation of the city council at a meeting of that body June 12.

In future any bus line or company wishing to operate in Woodstock or between Woodstock and other points, and using Dundas street or streets on the same general line of the street railway, will have to pay a license fee of $800, which is paid by the street railway. Of this amount $300 is for taxes and the remaining $500 is for the annual rental for a period of ten years starting from 1921.

Current News and Notes

Arborg, Man.

The Manitoba Government Telephones are putting in a new exchange building at this place.

Brockville, Ont.

The Canada Gazette announces the incorporation of Code & Tett Limited, with a capitalization of $50,000 for the purpose of carrying on the business of electrical engineers, contractors, etc. Head office, Brockville.

Caradoc, Twp., Ont.

The township's council is starting the construction of an electric lighting and power distribution system. Work will shortly be started on a section from Delaware to Melbourne, a distance of 10 miles, estimated to cost about $18,000. It is likely that the line will be extended later.

Elmira, Ont.

At Elmira the Hydro rates in 1914 were 9.5 cents for domestic lighting and 7.1 cents for commercial. Now the rates are 3.1 cents and 3.2 cents, respectively. Similar reductions hold for Baden, New Hamburg and Milton. 80 per cent. of the houses in Elmira are wired.

Emerson, Man.

The contract for the lighting requirements of Emerson, Man. has been awarded to B. Manger, Ste 7, Vingolf Apts., Winnipeg, Man. Contract price $12,000. Elec. Engr., George L. Guy.

Grimsby Beach, Ont.

The annual picnic of the Hydro-Electric Power Commission of Ontario was held here recently. Between six and seven hundred persons were present.

Hanna, Alta.

The town of Hanna is putting in an electric power plant. Tenders are being received by the secretary until August 7th., for one 50 and one 100 kw. generator and exciter, two 150 h.p. return tubular or water tube boilers complete including mechanical stokers. There will also be required switchboard, street lighting equipment, transformers, copper wire, &c. The work is being handled by Haddin and Myles, consulting engineers, Calgary, Alta.

Halifax, N. S.

The hearing of the Halifax Tram Company valuation before the Nova Scotia Board of Public Utilities, came to a close after a series of sessions extending over a period of nearly two weeks. The Commission comprises: J. U. Ross, chairman; R. T. McIlreith, K. C., and P. R. Colpitt, city electrician. Experts upon whose opinions much of the evidence was based were, Mr. Moreland, of Jackson and Moreland, engineers, of Boston, who made the valuation for the Public Utilities Board; and W. B. Mackenzie, of Moncton; John Preston, and C. W. Fowler, engineers for the city; L. H. Wheaton, for the citizens group. For the company were L. R. Nash and Major Hayes of Boston.

Kitchener, Ont.

The Kitchener Board of Trade has formally indorsed the bylaw to raise $70,000 by debentures for the purpose of extensions and improvements to the Kitchener street railway in the way of new car barns and new cars. Citizens are showing considerable interest in the plebiscite, and there is every indication that the bylaw will be promptly indorsed by the ratepayers.

Kingston, Ont.

A fire, which started in a three storey building here, caused $20,000 loss. The top flat was occupied by the plant of the Monarch Batteries Company, which suffered $7,000 to $8,000 damage. The building was owned by the Street Railway Company.

Kingston, Ont.

Last year the City Council made an agreement with the Street Railway Company that it would not ask it to do further retracking for street pavement for three years. Citizens now want other sections of the street railway line paved, so so the Company will submit to the Council a proposition to continue retracking necessary portions of its line if the city will agree to permit it to increase its five-cent cash fare to six cents. The company says it must increase its revenue if it is to continue making large expenditures on new tracks.

Montreal, Que.

The latest telephone directory is the largest volume of that character ever issued in Montreal. There are approximately 85 000 subscribers.

Mr. H. A. Terreault, the new director of public works, Montreal, has had a 30-million gallon steam pump in the water department, changed over to electric drive. Substantial economies are claimed.

Ottawa, Ont.

An electrically operated dredge, built at an outlay of approximately $175,000 by an Ottawa firm, was recently moved out of Victoria Island shipyard en route for Kingston. It will be used on the Queenston canal.

Picton, Ont.

Hydro service rates were materially reduced by announcement of the Commission Board recently. Domestic rates for lighting and cooking of 6 cents and 3 cents were reduced to 3 and 2 cents per kilowatt, respectively. Commercial rates of 12 cents and 6½ cents were reduced to 8 cents and 4⅛ cents. Power rates of 6.4 cents, 4.3 cents and 0.15 cent, were reduced to 5.6 cents, 3.8 cents and 0.15 cent.

St. John's, P. Q.

The Southern Canada Power Company, has arranged for another manufacturer from the United States to establish a branch factory in the eastern townships. The organization is the Franco-American Company, who are now erecting a large plant at this place.

Toronto, Ont.

Mr. A. D. Le Pan, superintendent, is receiving tenders until Aug. 26th., for a turbo-generator set, to be used in connection with the central heating and lighting system of the University of Toronto.

Three Hills, Alta.

The Provincial Government, Dept. of Telephones, Edmonton, is calling for tenders for the erection of a telephone exchange at this place.

Viking, Alta.

The Provincial Government, Department of Telephones, is calling for tenders for the erection of a telephone exchange at this place. Alternative construction, brick veneer or frame. Plans and specifications with Supt., Edmonton.

Winnipeg, Man.

Miss Marjorie Glassco, 16-year old daughter of J. G. Glassco, general manager of the Winnipeg Hydro system, recently rescued J. Young, an employee of the Hydro, from drowning at Point Du Bois.

Wiring Contracts Awarded

Barrie, Ont.

Kilgone & Lambert, $4,500 res., Clapperton St.

Belisles Mills, Que.

F. Neyrinck, 825 De Gaspe St., Mtl., $24,000 convent, Co. Terrebonne.

Burlington, Ont.

T. Murphy, $60,000 school, Baldwin Street.

Crowland Twp., Ont.

F. Sage, Cross St., Welland, $32,000 school, Maple Leaf Park.

Fort Erie, Ont.

H. Jamieson, $5,000 res., Queen St.

Fredericton, N. B.

Ralph Sutton, $4,000 res., Northumberland St.

Kitchener, Ont.

Doerr Elec. Co., King St. W. $13,400 station, King E.

Lachine, Que.

Mr. Bellefeuille, $8,500 res., 39th Ave.; flats, $25,000, Notre Dame & 13th Street.

Cdn. Crocker Wheeler Co., transformers for power house, 19th Ave. Contract price $6,100.

Monarch Electric, St. Lambert, distribution board for power house, 19th Ave. Contract price, $2,300.

Merritton, Ont.

E. Desand, 187 St. Paul St., St. Catharines, res., 2 storeys stone and brick.

Montreal, Que.

J. A. Roy, 221 Van Horne Ave. apt. house $80,000, 5628 Sherbrooke St. W.

J. A. St. Amour, 2171 St. Denis St. $63,850, "Morin" school; on convent, Mt. Royal Ave. & Cartier St.; add. convent cor. Notre Dame & Joliette.

G. Shearington, 3186 Park Ave. 2 res., 422 Beaconsfield Ave.

Mr. Labelle, 2 res., $14,000, Monkland Blvd.

O. Labelle, $40,000, 12 flats, Hampton Ave.

A. Boismenu, 391 Belanger St. $6,000 res., St. Clair St.

W. Cousineau, 1659 Notre Dame St. W. $9,000, 3 flats, St. Philippe St.

Sayer Electric Co., 87 Bleury, stores $12,000, 591 Mount Royal Ave.

Collyer & Brock, 131 St. Alexander St., warehouse, McGuire & DeDaspe Sts.

R. S. Muir & Co., 32 Park Ave., $16,000, 2 res., N. D. G. & Draper.

Moncton, N. B.

T. Johnston & Co. Ltd., 895 Main St., $15,000 theatre, Main Street.

Brooks Plumbing Co., Lutz St., $8,000 res., High Street.

Wm. G. Crowley, 281 St. George St., $4,000 res., Maple Street.

Edgar LeBlanc, Church St., $4,000 res., Maple St.; $5,000 res., Marjorie St.; $6,000 res., West St.; $6,400 res., Lutz St.; $5,400 res., High St.

Ottawa, Ont.

Marchand Electric Co., Bank National Bldg., $35,000 school, Rockcliffe School Area.

N. Ladouceur, LaBreton St., $12,400 res., Sandyhill.

Mr. Bartlett, Westboro, $10,000 apts., Cartier Street.

Mr. Hoffman, Westboro P. O., $4,000 res., Huron Ave.

P. Ackroyd, 420 Bank St., $6,000 res., 3rd. Ave.

A. Davis, LeBreton St., $8,000 res., Java Street.

N. Young, $5,000 res., Hampton Ave.

A. E. Fitzsimmons, 383 Chapel St., two $10,000 res., Driveway.

E. Headly, 645 Echo Dr., $9,500 res., Driveway; $10,000 res., Driveway.

Outremont, Que.

Arthur Seguin, 1155 Bordeaux St., $12,000 res., 197 Cote St. Catherine Rd.

M. Deneger, $30,000 double cottage, Davaar Ave.

St, Catharines, Ont.

H. C. Holmes, 30 Ann St., $3,000 3 res., Linden Ave.

Mr. Dunnett, Sherwood Ave., $3,500 res., Gibson Place.

C. Widdicombe, 5 Stuart Ave., $6,000 res., Welland Ave.

A. B. Cudney, 22 Thomas St., $9,000 res., 153 Geneva St.

Mr. Desand, 187 St. Paul St., $3,500 res., 12 Ottawa St.

I. Beatty, 10 Facer St., $4,500 store, Niagara St.; 12 res., $3,000 each, Rodman St.; $2,500 res., Trapnell Street.

St. John West, N. B.

Webb Electric Co., 91 Germain St., $150,000 school, Duke Street.

Sault Ste. Marie, Ont.

J. H. Stearns, 112 Lansdowne Ave., $30,700 fire hall, Wellington & Bruce Sts.

Taylor Bros., 106 St. Andrews Terrace, on stores, Gore Street.

R. C. Farmer, 36 Albert St. W., $4,500 res., Putney Rd., on stores, Gore Street.

Stratford, Ont.

Bennington Electric Co., Ontario St., $4,000 res., Douglas Street.

J. Brandy, Cobourgh St., $4,000 res., St. Vincent Street.

Toronto, Ont.

Taylor Bros., 25½ Norwood Rd., $7,000 res., Oakcrest Ave.

S. Lichman, 410 Parliament St., 4 stores $8,000, Danforth Ave.

Mr. Shea, res., 228 Willard Ave.

H. Hankins, 209 Silverbirch Ave., res. $4,500, Haslett Ave.; 2 pair res., $8,000, Haslett Ave.

Richardson & Cross, 81 King E., $10,000 store, 942-4 St. Clair Ave.

G. Armstrong, 1217 College St., $15,000 res., Northcliffe Blvd.; $7,500, 2 res., 70-2 Evans Ave.

E. Ash, Todmorden, 4 res., $4,000 each, Burgess Ave. & Glenmount Park Rd.; $4,000 each, 10 res., Glenmount Park Rd.

Harry Meeks, $5,000 bungalow, Elmer Ave.; $8,000 res., 108-110 Elmer Ave.; $4,500 res., 112 Elmer Ave.

Snell & White, 264 Harvie Ave., $6,500 res., 118 Northcliffe Blvd.; $7,500 res., Cloverlawn Ave.; $7,000 each, 4 res., Lauder Ave.; $7,500 each, 2 res., Cloverlawn opp. Westmount Ave.; $7,000 each, 3 res., W. S. Lauder Ave.

Smart & Walsh, 130 Bingham Ave., $7,000 res., Hammersmith Ave.; $7,000 store, 1973 Queen E.; $5,000 res., W. S. Oakdeane Cres.

Verdun, Que.

Emile Robbillard, 225 Hamilton St., $83,000 school, Galt Ave.

Victoria, B. C.

Sun Electric Co., 643 Yates St., $7,500 dairy bldg., View Street.

Waterloo, Ont.

J. Schweitzer, $6,000 res., Willow Street.

Otto Reiber, King St., $5,500 alts. office bldg., Davis Blk.

Westmount, Que.

Booth Bros., 5727 Sherbrooke St. W., $65,000 res., Western Ave.

Wanted Position—Electrical superintendent or manager of power and lighting plant in town of from five to twenty thousand population. Capable of position as city or municipal engineer, good executive, can furnish letters if required. Address Box 29, Electrical News, 106 Winch Building, Vancouver, B. C. 15

Position wanted—by energetic, single man age 32, technical training and eight years' practical work, with largest steel, copper and coal concerns in East and West, at present in Northwest mining town and desires to move East. Any commercial or industrial opening with prospects acceptable. Box 958, Electrical News, Toronto. 14-16

FOR SALE

1 CROCKER WHEELER—150 H.P. 750 R.P.M. 550 volts 25 cycle 3 phase slip-ring 3 bearing Induction Motor with slide rails pulley and secondary controller for two minute starting duty only. With controller is furnished one primary interlocked oil switch with No-voltage and overload relays.

Apply to H. T. Jamieson, C.A. Trustee, 807 Royal Bank Building, Toronto. 13-14

SECOND-HAND METERS FOR SALE

48—Type G, Packard—5-10 Amp—$3.50 each.
15—Type E, Packard—5-10 Amp— 1.00 each.
50—Type B, Ferranti—5-10 Amp— 5.00 each.
38—G —5-10 Amp— 1.00 each.
5—Stanley —5-10 Amp— 1.00 each.

The above meters are 110 volt, 2 wire, 60 cycle meters, and items one and three have been adjusted to pass inspection, items two, four and five have not been adjusted.

Hydro-Electric Power Commission of Ontario,
Engineering Dept., 190 University Ave.,
Toronto.

14-17

Planning the Day's Work

Association with numerous electrical contractor-dealers has shown that few of them have any idea or well developed plan of what the next day's work will be.

If the contractor-dealer has a crew of two or more men, he probably lays out the work for them the evening before, but most contractor-dealers fail to make any plans for the part of their organization which should be considered their selling force.

Certainly he should set a mark for the day's work. Too frequently he practically wastes the whole day because he hasn't any definite program, or spends too much time listening to the latest stories or the incidents of someone's week end trip. An outsider cannot make his plans for him, but he should arrange his work so that he can devote a certain portion of each day or week to the building up of his business.

He may want to take the major part of one day to solicit wiring jobs and the major portion of another day to sell lighting equipment. It is better to concentrate for a few days on house wiring and then spend an equal amount of time selling lighting equipment for the home.

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In Stock for Immediate Delivery

100 h.p.,	3 ph.,	25 cyl.,	550 volts,	710 r.p.m.
60 h.p.,	3 ph.,	25 cyl.,	550 volts,	750 r.p.m.
52 h.p.,	3 ph.,	25 cyl.,	550 volts,	720 r.p.m.
50 h.p.,	3 ph.,	60 cyl.,	550 volts,	970 r.p.m
50 h.p.,	3 ph.,	25 cyl.,	550 volts,	720 r.p.m.
35 h.p.,	2 ph.,	60 cyl.,	200 volts,	1150 r.p.m.
30 h.p.,	3 ph.,	25 cyl.,	550 volts,	750 r.p.m.
30 h.p.,	3 ph.,	25 cyl.,	550 volts,	1500 r.p.m.
25 h.p.,	3 ph.,	25 cyl.,	550 volts,	750 r.p.m.
15 h.p.,	3 ph.,	25 cyl.,	220 volts,	720 r.p.m.
15 h.p.,	3 ph.,	25 cyl.,	550 volts,	750 r.p.m.
15 h.p.,	3 ph.,	60 cyl.,	220 volts,	1200 r.p.m.
13 h.p.,	3 ph.,	25 cyl.,	550 volts,	700 r.p.m.
10 h.p.,	3 ph.,	66 cyl.,	220 volts,	1333 r.p.m.
7½ h.p.,	2 ph.,	60 cyl.,	200 volts,	1120 r.p.m.
5 h.p.,	3 ph.,	60 cyl.,	550 volts,	1750 r.p.m.
5 h.p.,	3 ph.,	25 cyl.,	550 volts,	1500 r.p.m.
3 h.p.,	3 ph.,	60 cyl.,	550 volts,	1750 r.pm.
3 h.p.,	3 ph.,	60 cyl.,	550 volts	1120 r.p.m.
3 h.p.,	3 ph.,	25 cyl.,	550 volts,	1500 r.p.m.
3 h.p.,	3 ph.,	25 cyl.,	550 volts,	1400 r.p.m.
2 h.p.,	3 ph.,	60 cyl.,	550 volts,	1750 r.p.m.
2 h.p.,	3 ph.,	25 cyl.,	550 volts,	1440 r.p.m.
2 h.p.,	3 ph.,	25 cyl.,	550 volts,	1400 r.p.m.
1 h.p.,	3 ph.,	25 cyl.,	550 volts,	1500 r.p.m.
1 h.p.,	3 ph.,	25 cyl.,	110 volts,	1420 r.p.m.
1 h.p.,	3 ph.,	25 cyl.,	220 volts,	710 r.p.m.
½ h.p.,	1 ph.,	60 cyl.,	110 volts,	1725 r.p.m.
1/6 h.p.,	1 ph.,	60 cyl.,	110 volts,	1725 r.p.m.
1/6 h.p.,	1 ph.,	60 cyl.,	110 volts,	1150 r.p.m.

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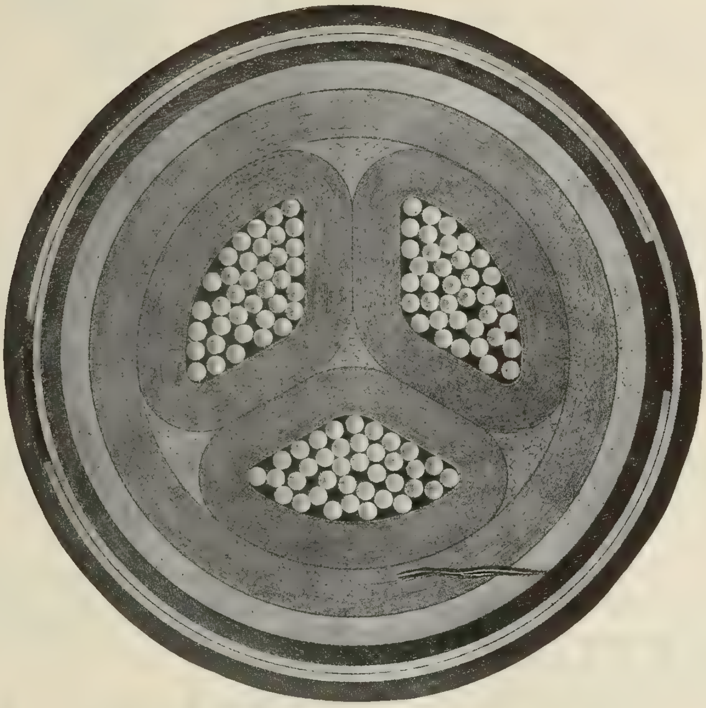

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Built to Specification of Hydro-Electric Power Commission of Ontario

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3-5-7½-10-20-30 H.P. and upwards all complete.

All sizes of repulsion type single phase motors.

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All sizes of single phase motors, repulsion type only.

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YES—We can supply you with that receiving set you want. OR get that loose-coupler, tuning coil, condenser, insulator, grounder, battery, detector, wire, variometer FROM US.

ASK US QUESTIONS ABOUT YOUR SET OR WHAT YOU WILL INSTALL.

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220 Volt - 3 Phase - 25 Cycle

1— 5 HP. Robbins & Myers, 1500 rpm. Complete.
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1—10 HP. Can. Westinghouse, 750 rpm. Base Pulley & Starter.
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2—50 HP. Crocker Wheeler, 750 rpm Base, Pulley & Starter.
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220 Volt - 3 Phase - 60 Cycle

1— 5 HP. Can. Gen. Electric 1200 rpm. with Pulley.
1—15 HP. Crocker Wheeler 1200 rpm. Base, Pulley & Starter.
1—30 HP. Can. Westinghouse 1200 rpm. Base, Pulley & Starter.
1—35 HP. Can. Westinghouse 1200 rpm. Base, Pulley & Starter.
1—40 HP. Can. Gen. Electric 1200 rpm. Base, Pulley & Starter.

25 Cycle Single Phase Motors 110/220 Volt

2—1/4 HP. Century, 1500 rpm.
2—1/2 HP. Century, 1500 rpm.
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3—3 HP. Gen. Elec. Type RI 1500 rpm.
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1—1½ HP. Century 110/220 V. 1460 rpm. 25 cycle.
1— 2 HP. Century 110/220 V. 1460 rpm. 25 cycle.

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2—30 HP. Can. Westinghouse 1200 rpm. Base Pulley & Starter.
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1—20 H.P. 1200 RPM. Westinghouse, Complete
1—15 H.P. 1800 RPM. C.W., Complete
1—7½ H.P. 1800 RPM. T.H.E., Complete
1—7½ H.P. 1200 RPM. A.C., Complete
1— 5 H.P. 1200 RPM. Westinghouse
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1— 1 H.P. 1800 RPM. T.H.E.
1— 2 H.P. 1800 RPM.

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1—7½ H.P. 1800 RPM. T.H.E., Complete
1— 3 H.P. 1800 RPM. T.H.E.
1— 1 H.P. 1800 RPM. T.H.E.
1—½ H.P. 1800 RPM. T.H.E.

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1— 1 H.P. 1500 RPM. Westinghouse
1— 1 H.P. 750 RPM. T.H.E.
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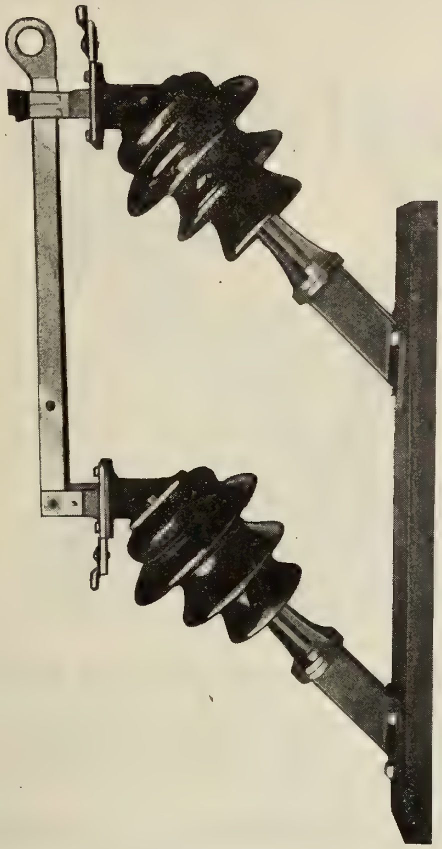

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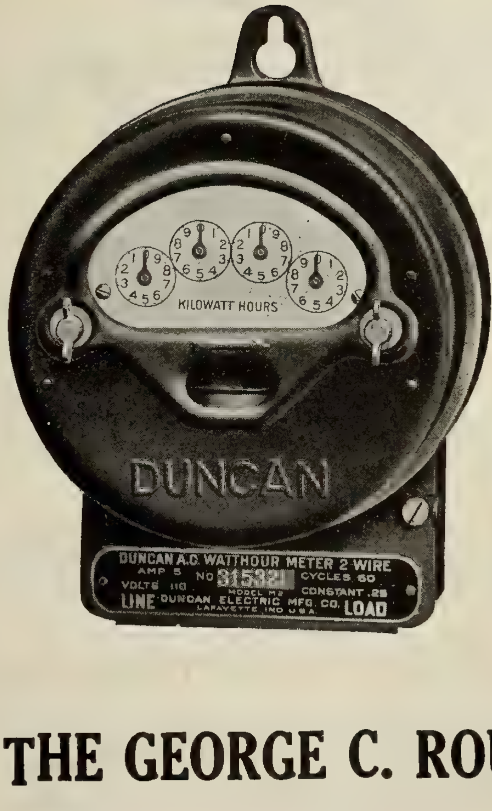

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The most practical equipment devised for fancy wearing apparel. Weight 90 lbs. Movable sleeve-board—push button—pilot light—dampening pans—completely equipped.

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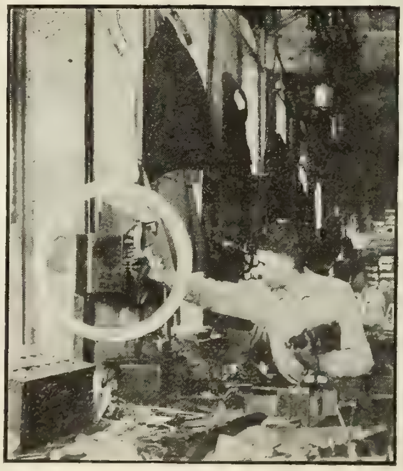

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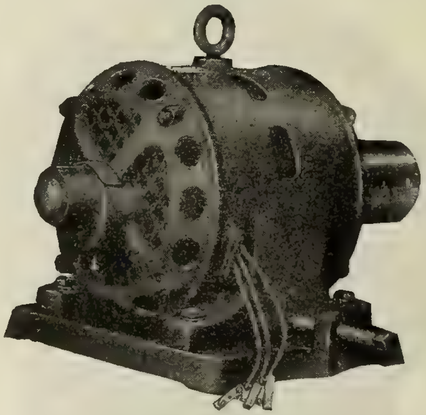

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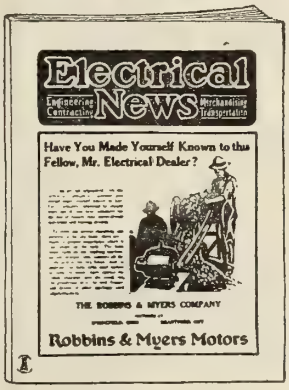
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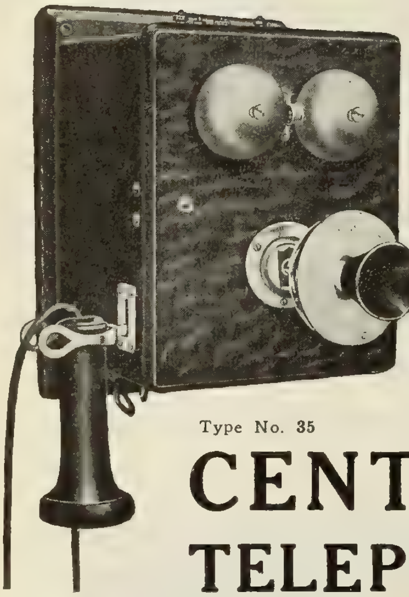

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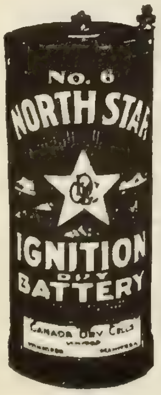

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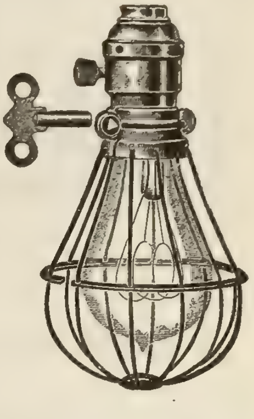

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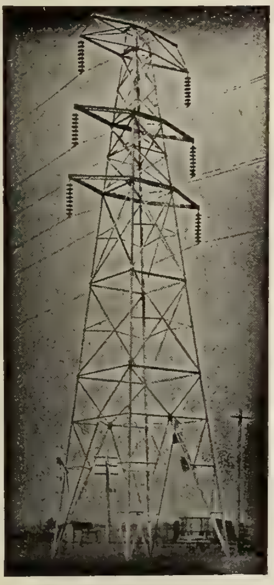

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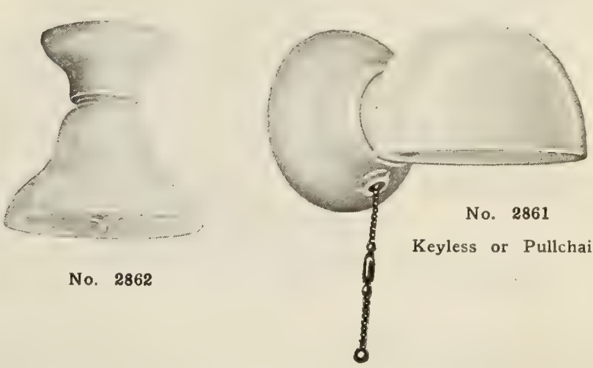

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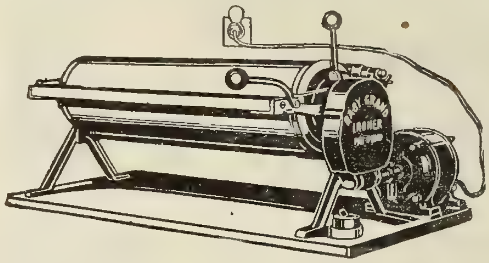

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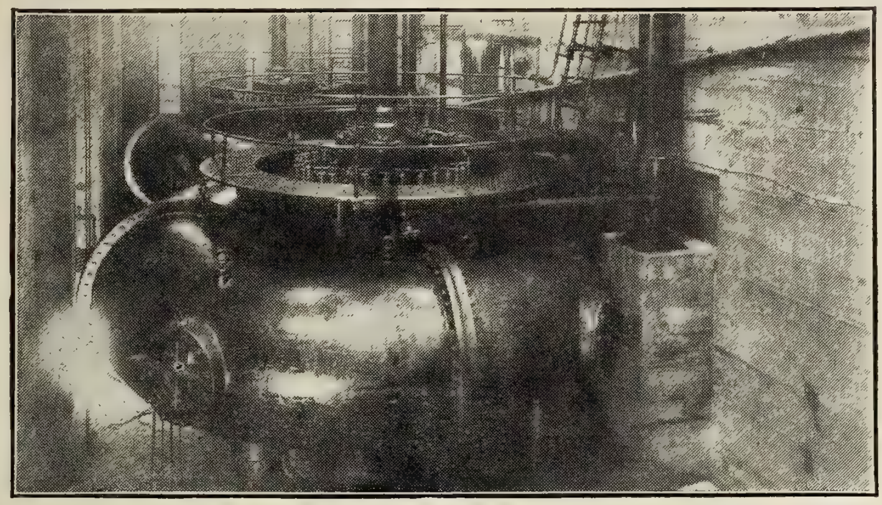

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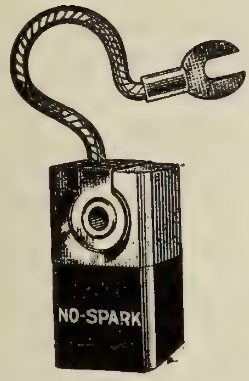
THERE ARE MORE EXPENSIVE BRUSHES—BUT NONE MORE EFFICIENT



No-Spark carbon brushes are frictionless. They will not chip or split and they give a no-spark commutation.

Economy is their middle name—we have instances of them outlasting 12 sets of ordinary brushes.

Write for Bulletin.

CALEBAUGH
Self-Lubricating Carbon Co.
1503 Columbia Ave., PHILADELPHIA, PA.

Canadian Representative
Cassco General Supplies, Reg'd., 315 Craig St., W.
Montreal, Canada

PLANT OF GOODYEAR TIRE AND RUBBER CO., LIMITED, TORONTO
Elec. Cont. Beattie McIntyre, Limited, Toronto.

STANDARD
Rubber Insulated Wire

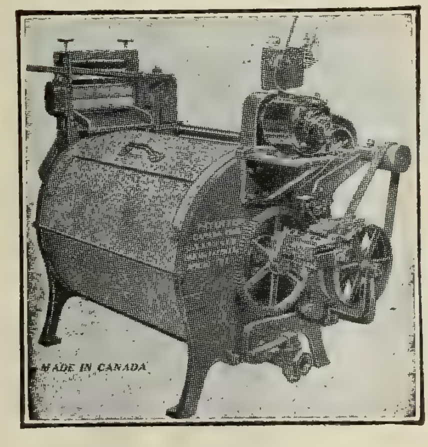
was used through this large factory because the superior durability of STANDARD Wire makes for safety and economy.

If you are interested in securing a high grade dependable wire at a reasonable price, write our nearest office for samples and prices of STANDARD Wire.

Standard Underground Cable Co.
of Canada, Limited

Branch Offices and Warehouses.
Montreal, Toronto, Hamilton, Winnipeg, Seattle.
Factory at Hamilton

Electric Washing Machines
FOR
HOTELS HOSPITALS INSTITUTIONS
AND
LAUNDRIES OF EVERY DESCRIPTION



With Patented Single Belt Reverse Movement

A
Real
Washer
For
Commercial
Work

Strong
Durable
Efficient
Economical

Made in all standard sizes with wood or iron casing. Run by motor and connected with lighting circuit or from line shafting, or gasoline engine.

AGENTS WANTED

SUMBLING MACHINERY CO., Limited
7-15 St. Mary St., Toronto
Manufacturers of Laundry Machinery

Kingsbury Thrust Bearings
Made in Canada

Our pivoted-block Thrust Bearings are a complete solution of all thrust bearing problems in hydro-electric units, steam turbines, ships' propeller shafts, centrifugal pumps, and similar work involving heavy loads and high or low speed.

Maximum Durability and Reliability.

Lowest possible Friction.

No Limit to Loads or Speeds.

Protected by numerous Canadian Patents.

Complete manufacturing facilities in Canada, ensuring prompt deliveries and service.

Send for catalogue.

Kingsbury Machine Works
Frankford, Philadelphia, Pa.

CLASSIFIED INDEX TO ADVERTISEMENTS—CONTINUED

SPECIAL HEATING APPLIANCES
National Electric Heating Company

STEEL PLATE WORK
Kennedy, William & Sons
Rough Sales Corporation George C.

STOP LOG WINCHES
Kennedy, William & Sons

STORAGE BATTERIES
Canadian General Electric Co. Ltd.
Canadian National Carbon Co.
Exide Batteries of Canada, Ltd.
Northern Electric Company

STREET LIGHTING FIXTURES
Canadian General Electric Co. Ltd.
Northern Electric Company
Winter Joyner, A. H.

SWITCHBOARD SLATE AND MARBLE
Davis Slate & Mfg. Company

SWITCHES
Banfield, W. H. & Sons
Canadian Drill & Electric Box Company
Canadian Johns-Manville Co.
Canadian Westinghouse Company
Chamberlain & Hookham Meter Company
Devoe Electric Switch Company
Electrical Maintenance & Repairs Company
G. & W. Electric Specialty Company
Moloney Electric Company of Canada
Northern Electric Company
Square D Company
Schweitzer & Conrad, Inc.

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Canadian Johns-Manville Co.
Canadian Westinghouse Company
Devoe Electric Switch Company
Ferranti Meter & Transformer Mfg. Co.
Moloney Electric Company of Canada
Monarch Electric Company
Northern Electric Company

SWITCH GEAR
Ferranti Meter & Transformer Mfg. Co.
Monarch Electric Company

TAPE
Canadian Johns-Manville Co.
Packard Electric Company
Northern Electric Company

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Century Telephone Construction Company
Macgillivray, G. L. & Co.
Minnestoa Electric Co.
Northern Electric Company

THRUST BEARINGS
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Kingsbury Machine Works

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Canadian Westinghouse Company
Equator Manufacturing Company
National Electric Heating Company
Northern Electric Company

TOOLS
Klein, Mathias & Son
Northern Electric Company

TOP PINS
Lachute Shuttle Co.

TOY TRANSFORMERS
Canadian General Electric Co. Ltd.

TRANSFORMERS
Canadian Crocker-Wheeler Company
Canadian Westinghouse Company
Ferranti Meter & Transformer Mfg. Co.
Moloney Electric Company of Canada
Monarch Electric Co.
Northern Electric Company
Packard Electric Company

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Can. Link-Belt Co.
Canadian Bridge Company

TROLLEY GUARDS
Ohio Brass Company

TURBINES
Canadian Westinghouse Company
Boving Hydraulic & Engineering Company
Canadian Allis-Chalmers Company
Kennedy, William & Sons
Smith Company, S. Morgan

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Northern Electric Company
Standard Underground Cable Co., of Canada

VACUUM CLEANERS
Canadian General Electric Co. Ltd.
Hoover Suction Sweeper Co. of Canada
Northern Electric Company

VARNISHES
Spielman Agencies, Registered

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Canadian General Electric
Earle Electric Limited
Great West Electric Co.
Northern Electric Company
Onward Mfg. Co.

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Kennedy, William & Sons
Smith Company, S. Morgan

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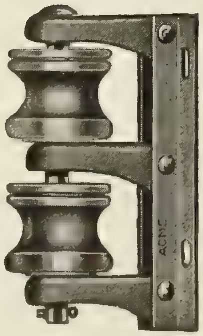
Boston Insulated Wire & Cable Company, Ltd.
Northern Electric Company
Phillips Electrical Works, Ltd., Eugene F.
Standard Underground Cable Co., of Canada Ltd.

WIRING DEVICES
Banfield, W. H. & Sons
Canadian General Electric
Northern Electric Company

WOOD SCREWS
Robertson Mfg. Company, P. L.

Peirce Secondary Racks

For Vertical Secondary Distribution



No. 250
4 inch Spacing

Low First Cost.

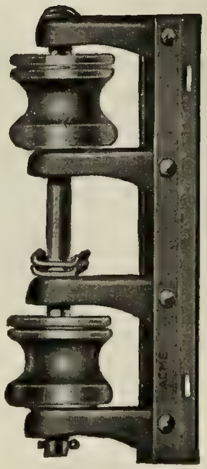
The first cost of Peirce Secondary Racks complete with insulators is less than a good grade of wood cross arms complete with pins and insulators.

Low Installation Cost.

To mount a Peirce Secondary Rack on a pole, it requires boring one hole for a through bolt and driving one lag screw. No gains to cut—no arms to pin or handle—no cross arm braces to assemble.

No Maintenance Cost.

Peirce Secondary Racks are made of open hearth steel, galvanized by the double hot dip process. They out-live the poles on which they are mounted.



No. 258
8 inch Spacing

"Ask your jobber"

N. SLATER COMPANY, LIMITED
HAMILTON ONTARIO

Electrical
Mechanical
Chemical

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and Special Representatives

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Research
Patents

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Consulting and Supervising Engineers
Hydraulic, Steam and Electrical Power Plants, Industrial and Municipal Engineering.
Traders Bank Building, Toronto

DeGASPE BEAUBIEN
Consulting Engineer
28 ROYAL INSURANCE BUILDING, MONTREAL

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CONSULTING ENGINEER
Steam, Hydraulic, Electric.
Reports, Estimates, Arbitrations.
POWER BUILDING, MONTREAL

ALLEN ENGINEERING CO.
INSPECTION ENGINEERS
Inspection during manufacture. Tests and Reports before shipping of: Electric Power Apparatus, Wires, Cables, Insulators, Transmission Towers and Hardware, Conduits, etc.
41 King Wm. St., HAMILTON, ONT.

J. M. Robertson, Limited
Consulting Engineers
Mechanical, Electrical, Hydraulic, Steam, Gas
Plans, Specifications, Estimates,
Tests, Reports and Supervision.
628 Coristine Bldg., MONTREAL, Que.

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Consulting Electrical Engineer
Tests, Reports, Arbitrations
Supervision of Lighting and Power Plants
Telephone Main 6727
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Mechanical Engineer and Registered Attorney
Expert in Patents, Trade Marks, Designs Copyrights and Infringements. 20 Years' Experience in Patents and Practical Engineering
Kent Building,
Yonge and Richmond Sts., TORONTO

Canadian Water-Powers Agency
(Registered)
CHARLES BRANDEIS, C.E., E.E.
Consulting Engineer
We negotiate sale and purchase of developed and undeveloped water-powers.
Estimates made on power available and costs of development.
390 Phillips Place, MONTREAL
Telephone Uptown 2825.

EARL W. MORPHY
Meter Engineer,
Meters tested, recalibrated and repaired.
Previous to Government inspection.
92 Gould St.
Toronto.
Soo, Ont.

KERRY & CHACE, Limited
ENGINEERS
President: J. G. G. Kerry
Associates; A. L. Mudge, H. R. McClymont
Hydro Electric & Steam Power Developments, Steam & Electric Railways, Pulp & Paper Mills, Industrial Engineering.
Confederation Life Bldg., TORONTO

B.L. CLARK, GEN. MGR. H C. CHAPMAN, ASST. MGR. E F. LONGFELLOW, SEC. TREAS.
CANADA ELECTRIC CO.
Contracting Electrical Engineers
" Work That Counts "
MAIN 1556 175 KING ST. E., TORONTO

PROMPT and EFFICIENT ELECTRICAL REPAIRS
Give your electrical equipment the attention it deserves.
Our specialties are Re-wind and Motor Repairs A. C. & D. C. also Meter Repairing,
Electric Motor Repair Co.
349 Talbot St., London, Ont.

Electrical Testing
Laboratories

"Electrical, Photometrical and Physical Tests and Inspections".

80th Street and East End Avenue, New York, N.Y., U.S.A.

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Trade Marks and Designs Procured in all Countries
Special attention given to Patent Litigation
Pamphlets sent free on application
Ridout & Maybee
156 Yonge St. Toronto, Ont.

GEO. L. GUY
Electrical Engineer
Plans, Specifications and Estimates
Reports, Arbitrations and Valuations
Tribune Bldg. WINNIPEG

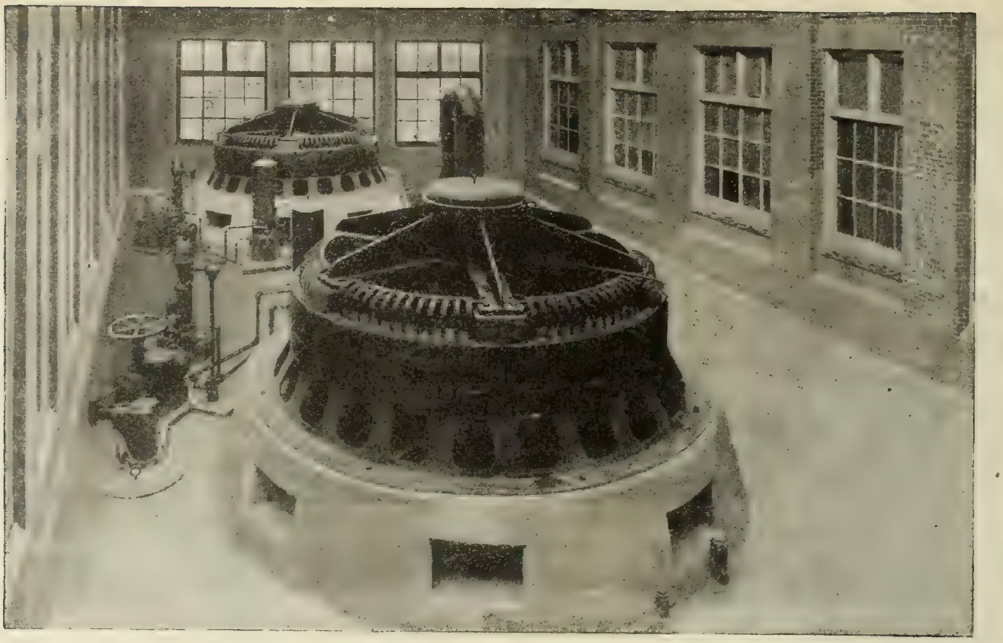
Save Money by Advertising for your Tenders

Competition will keep bids on your work or supplies down to the minimum figure. An advertisement in the

Tender Department
of the
Contract Record
and
Engineering Review

will put you in touch with the great majority of reliable contractors, and help you get the best firm for the job and the right price for the work.

Use the Contract Record Tender Department for the next job.



Westinghouse
Vertical Water-Wheel Generators

The successful hydro-electric plant depends upon the efficient, economical and dependable operation of the apparatus involved.

In Westinghouse Water-Wheel Generators the ruggedness of construction stands out clearly. The Kingsbury thrust bearing, ample proportions of guide bearings and brackets, cast-steel spider with bolted poles, mica insulated armature coils and a positive oiling system insure dependable operation and minimum maintenance cost. The relatively flat efficiency curve, typical of these generators, shows maximum economy over the average range of operating load.

Canadian Westinghouse Co., Limited, Hamilton, Ont.

TORONTO, Bank of Hamilton Bldg.
HALIFAX, 105 Hollis St.
CALGARY, Canada Life Bldg.
MONTREAL, 285 Beave. Hall Hill
FT. WILLIAM, Cuthbertson Block
VANCOUVER, Bank of Nova Scotia Bldg.
OTTAWA, Ahearn & Soper, Ltd.
WINNIPEG, 158 Portage Ave. E.
EDMONTON, 211 McLeod Bldg.

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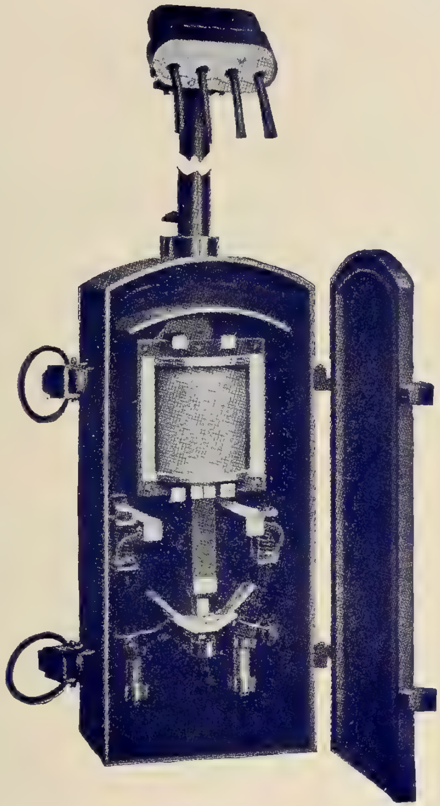
MONTREAL—113 Dagenais St.
TORONTO—366 Adelaide St. W.
VANCOUVER
1090 Mainland St.
WINNIPEG—158 Portage Ave. E.
CALGARY—316 3rd. Ave. E.

CANADIAN WESTINGHOUSE

Westinghouse



Cap. 30 Amp

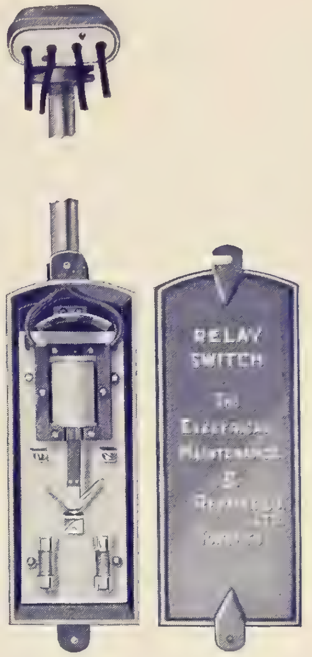
Engineers, Take Notice!

A new, smaller, simplified Remote Control Switch.

A young friend of our 30 Amp Switch—to do the many small jobs where the big fellow is too expensive.

Cheaper, yet perfectly dependable. Has been tested equal to five years' service.

For Street Lighting Control. Write about this.



Cap. 15 Amp

The Electrical Maintenance & Repairs
Company, Limited
162 Adelaide Street West **Toronto**

CANADIAN PORCELAIN CO.

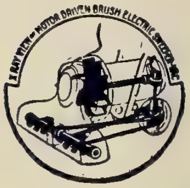
LIMITED

HAMILTON - CANADA

Manufacturers of High and Low Tension Porcelain Insulators

Electric
SWEEPER-VAC
With Motor Driven Brush

It Cleans and Sweeps without injury to the rugs
FULLY GUARANTEED
Sold on easy terms — We carry the accounts
Liberal Proposition for "Sweeper-Vac" Agencies


X-RAY VIEW — MOTOR DRIVEN BRUSH ELECTRIC SWEEPER-VAC

Banishes Dirt

EARLE LIMITED ELECTRIC

Abolishes Dusting

Takes the "Weeping" out of "Sweeping"
Write now for particulars and get lined up for the Spring Trade

66-72 NELSON ST.
TORONTO

Phone Adelaide 1081 — Adelaide 1082

CABLE TERMINAL DEVICES

POTHEADS, DISTRIBUTION BOXES

G & W 35,000 VOLT POTHEADS

for dependable service—

Continuous service from comprehensive distribution systems results from careful planning and from the selection of the right sort of equipment.

G & W Potheads are one strong link in any carefully planned system.

That they render a really dependable service, with little maintenance, has been proven on innumerable distribution systems.

You can judge them by the number of representative users who have adopted them as standard equipment.

The G & W Engineering Staff will co-operate with you in planning a completely serviceable distribution system. Tell us your problem.

G & W Electric Specialty Co.
7440-52 So. Chicago Ave. CHICAGO, U.S.A.
A. H. Winter-Joyner, Ltd., 62 Front St. W., Toronto.
A. H. Winter-Joyner, Ltd., 10 Cathcart Street Montreal.
Bentz-Richardson Co., Ltd., 592 Notre Dame Ave., Winnipeg.
General Supplies, Limited, Calgary and Edmonton.

G & W ELECTRIC SPECIALTY CO.

Vol. XXXI No. 16 Toronto, August 15, 1922

Electrical News

Engineering
Contracting

Merchandising
Transportation

MOLONEY

Performance Proves Its Merits Through 25 Years of Successful Service

A
Canadian
Made
Transformer

Write for
Bulletins
185 190
195 210

MOLONEY ELECTRIC COMPANY OF CANADA, LIMITED

Agents:
Frank Darling & Co., Ltd., Vancouver. General Supplies Ltd., Calgary.

District Offices	Factory	Head Sales Office
Montreal Halifax and Winnipeg	Windsor, Ont.	501 York Bldg. King & York Sts. Toronto

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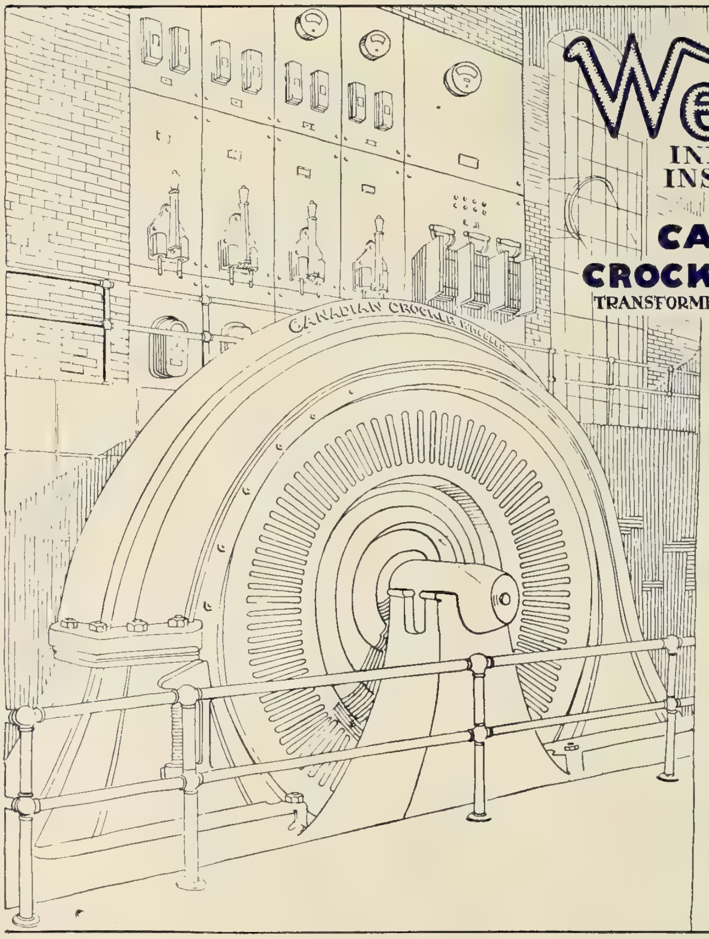
POWER APPARATUS

OF ESTABLISHED REPUTATION AND DEPENDABILITY



Weston
INDICATING INSTRUMENTS

ESTERLINE
GRAPHIC INSTRUMENTS

CANADIAN CROCKER-WHEELER
TRANSFORMERS & ELECTRICAL MACHINERY

CONDIT
OIL SWITCHES & CIRCUIT BREAKERS

SANGAMO
INTEGRATING INSTRUMENTS

C-H
CONTROL APPARATUS & HEATING EQUIPMENT

Wagner
SINGLE PHASE MOTORS

ELECTRICAL ENGINEERS EQUIPMENT CO
THREE 6
CHICAGO U.S.A.
SWITCH BOARD & PROTECTIVE FITTINGS

Northern Electric Company
LIMITED

MONTREAL TORONTO WINDSOR CALGARY
HALIFAX HAMILTON WINNIPEG EDMONTON
QUEBEC LONDON REGINA VANCOUVER

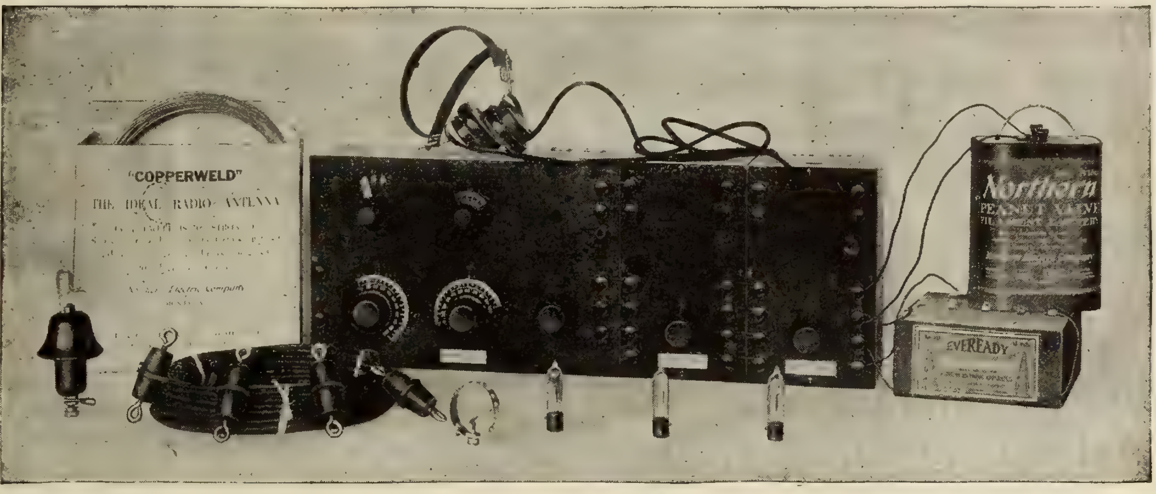
"Makers of the Nation's Telephones"

MANUFACTURING
- Manual Telephones
- Automatic Telephones
- Wires & Cables
- Fire Alarm Systems
- Radio Sending and receiving Equipment

DISTRIBUTING
- Construction Material
- Illuminating Material
- Power Apparatus
- Household Appliances
- Electrical Supplies
- Power & Light Plants
- Marine Fittings

ORDER THIS NEW SET EARLY

R 1000 Radio Telephone Receiving Set

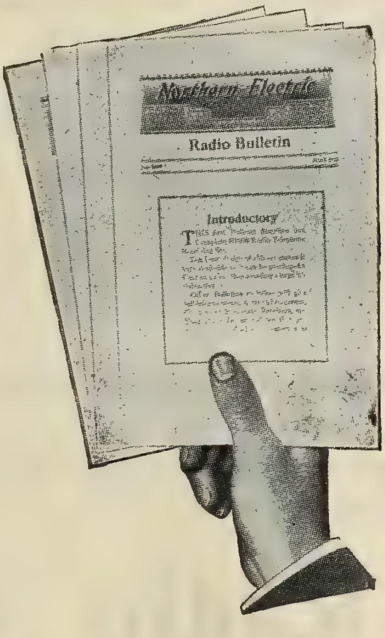


All Amateurs are your prospects with this set. You can sell it complete or a unit at a time in cases where the purchaser does not care to make a large initial outlay.

The wave length is from 200 to 600 meters, enabling the user to receive either local or distant Canadian or American Broadcasting, Shipping, Stock and Weather Reports, Official Time, etc.

Full instructions for installation and operation are packed with each set, thus simplifying your selling effort.

Detailed description and retail prices are in Bulletin No. 1000. Phone or wire our nearest House for your quota.


Northern Electric

Radio Bulletin

Introductory

The R1000 Radio Telephone Receiving Set Consists of:—

- 1 No. R1 Short Wave Tuner and Detector Unit.
- 2 No. R5 Amplifier Units.
- 1 No. R6 Double Head Set, 2500 ohms.
- 1 No. R650 Aerial System.
- 3 No. R215—A "Peanut" Valves.
- 1 No. R180 Northern Peanut Valve Filament Battery.
- 1 No. R90 45 Volt Plate Battery.

Northern Electric Company
LIMITED

MONTREAL TORONTO WINDSOR CALGARY
HALIFAX HAMILTON WINNIPEG EDMONTON
QUEBEC LONDON REGINA VANCOUVER

"Makers of the Nation's Telephones"

MANUFACTURING
Manual Telephones
Automatic Telephones
Wires & Cables
Fire Alarm Systems
Radio Sending and-receiving Equipment

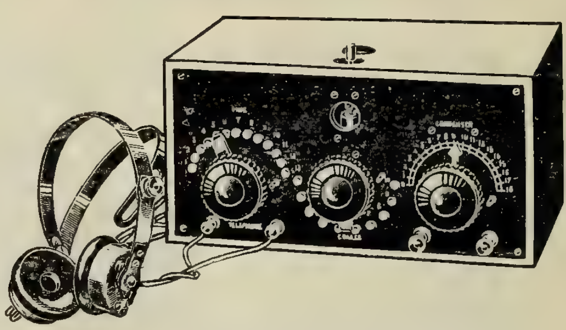
DISTRIBUTING
Construction Material
Illuminating Material
Power Apparatus
Household Appliances
Electrical Supplies
Power & Light Plants
Marine Fittings

Follow the QUALITY Mark

When the history of the **Radio** Boom is written it will be said that out of a host of Manufacturers entering the field, not more than a handful of organizations survived.

Those who survived will be the **Few** who have contributed to the advancement of the **Art** and maintained the high Quality Standard to which **Good Radio Equipment** must be built.

G. R. C. 2



Provisional Patent No. 17971/22

The Apparatus consists of a highly sensitive detector, entirely enclosed Tuning inductance, Variable Condenser, Fixed Condenser and G. R.C. 24 Unitone 4,000 OHM Headphones complete.

List complete with 4,000 OHM Unitone Headphones.

$25.00

G. R. C. Units from Crystal sets to the Multi-Valve sets, G. R. C. Unitone Headphones and accessories are delivered to you as THE FINEST instruments we can produce, of up-to-the-minute design at a REASONABLE PRICE.

Write for literature today

Excellent Distributors' proposition for open territory. Wire or write our Canadian Agents.

General Radio Company

Affiliated with

Cox - Cavendish Electrical Company, Limited
London - Harlesden - Edinburgh - Bradford

Sole Agents for Canada

Stephenson - Russell Limited

Winnipeg, Canada

Look for this booth at the Canadian National Exhibition

Booth 89A
Industrial
Building

Diamond-F

Electrical visitors to the Fair who are interested in better insulation are invited to see our display of "Condensite Celoron" (moisture proof) which will be a feature of our showing of Diamond Fibre for general insulation.

If you are not a visitor to the Exhibition we shall welcome an opportunity of giving you full information direct, regarding our special moisture proof and other Fibre insulating materials.

DIAMOND STATE FIBRE Co. OF CANADA LIMITED
— 235 CARLAW AVE. TORONTO —
PRODUCTS
DIAMOND F FIBRE
SHEETS, RODS, TUBES & SPECIAL SHAPES
PRODUCTS
DIAMOND STATE FIBRE
DIAMOND STATE FIBRE

Diamond State Fibre Company
of Canada Limited
Head Office and Works: 235 Carlaw Ave., Toronto, Can.

THE L. and N. COMPANY Limited
ST. JOHNS, Que.

MANUFACTURERS OF FLEXIBLE CONDUIT AND KRAFT PAPER CORD

LOOMDUCT

A Single Wall Conduit of Unusual Flexibility.

Every coil of "Loomduct" and "Insuladuct" is fished at the factory and guaranteed against defects of every kind.

INSULADUCT

A Double Wall Conduit of Great Strength and Durability.

TRADE MARK Loomduct REGISTERED

APPROVED BY THE
BOARD OF FIRE
UNDERWRITERS : :

TRADE MARK Insuladuct REGISTERED

THE FOLLOWING SIZES ALWAYS IN STOCK:— 1/4" 3/8" 1/2" 5/8" 3/4" 1"

Suppose You Were Central Station Manager in this City—

IN this city of 2500, there are actually 864 electric meters on the central station lines. Suppose 25 are power, 739 are house lighting, and 100 are commercial customers such as hotels, places of business, offices, etc. Along in September and October when it is too early for the furnace, electric heaters come into use. You don't know who uses them—you only see peak load demands on these cold, damp days when skies are dull, when heaters and lights together pull heavily on your equipment.

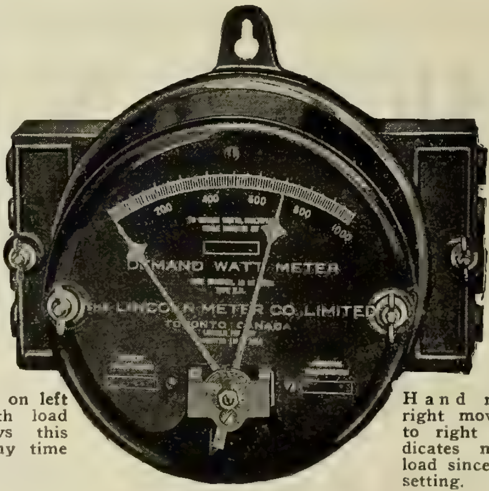
Unquestionably, all those 100 commercial customers should not be billed alike. If you are to distribute equitably your fixed charges, all those customers should not be billed on kw. hours alone. There is a wide range of demand along the line—a demand which should be measured as accurately as you measure the kw. hours.

With a Lincoln Maximum Demand Meter on those lines, each customer is billed on a correct basis. No one is penalized for a heavy demand caused by some other user. You extend, to a much larger clientele, the billing satisfaction which your Lincoln equipped power customers now enjoy.

A post card brings any definite information you may want, or any one of the following catalog sections:—

SECTION I, a non-technical treatise on why demand should be measured; SECTION II, the technical treatise on demand measurements; SECTION III, Installation; SECTION IV, the Lincoln Graphic Demand Meter; SECTION V, the Lincoln method of Volt-Ampere Demand Measurement (Power Factor recognition); and SECTION VI, the Lincoln Split Core Transformer and Demand Ammeter.

The Lincoln Meter Co., Limited
243 College Street, Toronto, Canada
Cable "Meters" Toronto Phone College 1374



Hand now on left varies with load and shows this load at any time of day.

Hand now on right moves only to right and indicates maximum load since last resetting.

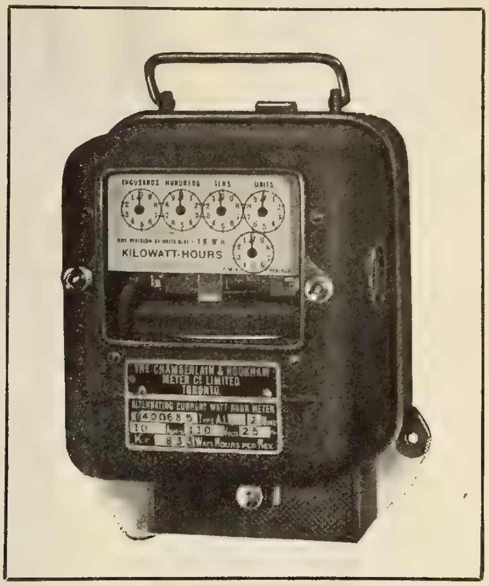
Lincoln
MAXIMUM DEMAND
meter

Government Re-Testing

302 C & H Meters were due for re-inspection in an Ontario town.

They were sent into the test room on Monday, the following Friday 302 Meters left the test room re-sealed, no parts or repairs being required to accomplish this end.

How's this for quality and reliability? Send us your orders.



Chamberlain & Hookham Meter Co., Limited

243 COLLEGE STREET, TORONTO Branches all over the World

Thomson Electric Motors

in use in many of the largest manufacturing plants in Canada

are built by

FRED THOMSON CO., LIMITED

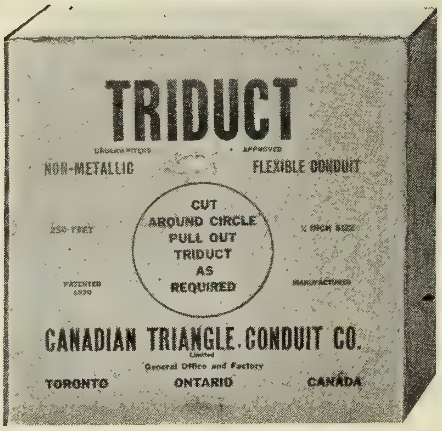
ELECTRICAL ENGINEERS

7-13 ST. GENEVIEVE STREET MONTREAL

TRIDUCT

One coil to a box

Regularly Inspected by Underwriters Laboratories


TRIDUCT
UNDERWRITERS APPROVED
NON-METALLIC FLEXIBLE CONDUIT
250 FEET
½ INCH SIZE
CUT AROUND CIRCLE PULL OUT TRIDUCT AS REQUIRED
PATENTED
MANUFACTURED
CANADIAN TRIANGLE CONDUIT CO.
Limited
General Office and Factory
TORONTO ONTARIO CANADA

Each coil tested and fished. A No. 10 wire can be inserted 35 feet without forcing. Order from your jobber by trade name TRIDUCT.

Selling Agents

Conduits Company Limited
33 Labatt Avenue TORONTO

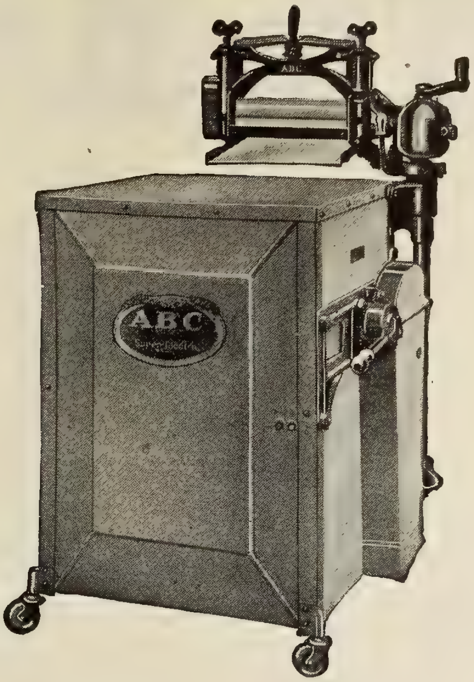
ABC

Super-Electric

$170

(*Retail Price*)

Except in B. C. and the Maritimes



Model No. 65-E. For your best trade, this A B C is ideal. It is the finest washer that money can buy or experience can produce. Wonderfully sturdy and simple. No springs. Quiet and vibrationless in operation. 50% oversize motor; aluminum wringer that locks automatically in any of 20 positions; safe, quick-acting pressure release for rolls; big, easy-rolling casters; handsome full cabinet; maple or zinc cylinders; galvanized tub. Model 66-E has copper tub; retails at $200.

The "Star" of the Complete A B C Line!

While the entire A B C Line is a genuinely high quality proposition, from the Alco's at $72 up, the stellar models are these A B C Super Electrics.

Frequently, in as high as three cases out of four, people who come in to see the lower-priced A B C's, choose Super Electrics instead.

When you consider that A B C Alco's at $110, and A B C Oscillators at $135, are unrivaled values in their respective classes, you can gain some idea as to how fine these Super Electrics at $170 and $200 must be!

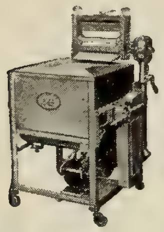
If you want to make a real success and real money in the sale of washing machines, lose no time in getting all facts concerning this A B C Line.

It is a splendidly balanced, complete line—one that embraces all three of the big-selling types of electric washers, viz: dolly, oscillating and cylinder. Engine drive dolly and cylinder types are also included.

The prices grade upwards in easy stages, as you will note below. There is an A B C for every prospect's purse!

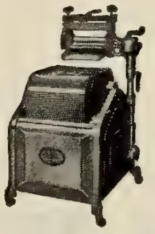
You can, therefore, profitably concentrate all your efforts upon A B C's. You can combine your orders, secure extra quantity discounts, cut your investment, simplify your sales, advertising and service work, reduce correspondence, etc.

Get in touch with us at once! Write or wire direct to the nearest A B C wholesale distributor, or to Brantford. Do it today!



A B C SUPER ELECTRIC (Semi-Cabinet)

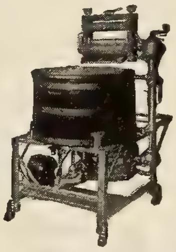
No. 60-E, galv. tub, wood wringer	$155
No. 61-E, copper tub, wood wringer	180
No. 60, galv. tub, wood wringer, engine drive	127



A B C OSCILLATOR (Electric)

No. 80-E, heavy gauge copper tub	$135

All prices quoted are retail. Slightly higher in B. C. and the Maritimes



A B C ALCO (Dolly or rub board)

No. 51, single tub, engine drive	$ 72
No. 52, double tub, engine drive	100
No. 51-E, single tub, ¼ h.p. motor	110
No. 52-E, double tub, ¼ h.p. motor	138

ALTORFER BROS. COMPANY, Peoria, Illinois

Pioneer and Leading Makers of Washers and Ironers

C. D. Henderson, *Canadian Representative*, Box No. 123, Brantford, Ont.

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Incandescent Lamp Cord, Flexible Switchboard Cables, Special Cords and Cables for all kinds of Electrical Work.

Prompt Shipments from Canadian Factory.

BOSTON INSULATED WIRE & CABLE CO., Limited

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The most perfect interior construction conduit on the market. Recognized as the standard of high quality.

Always specify Galvaduct or Loricated CONDUITS

"LORICATED"

A high-class interior construction conduit of the enameled type, proof against acid or other corrosive agents.

If your jobber cannot supply you—write us.

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TORONTO MONTREAL
Western Sales Office: 602 Avenue Building, Winnipeg

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The Twentieth Century Line

Black **Enamelled**

Made in Canada

- Flush Type Cabinets
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- Blank Condulet Covers
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- Meter Protectors
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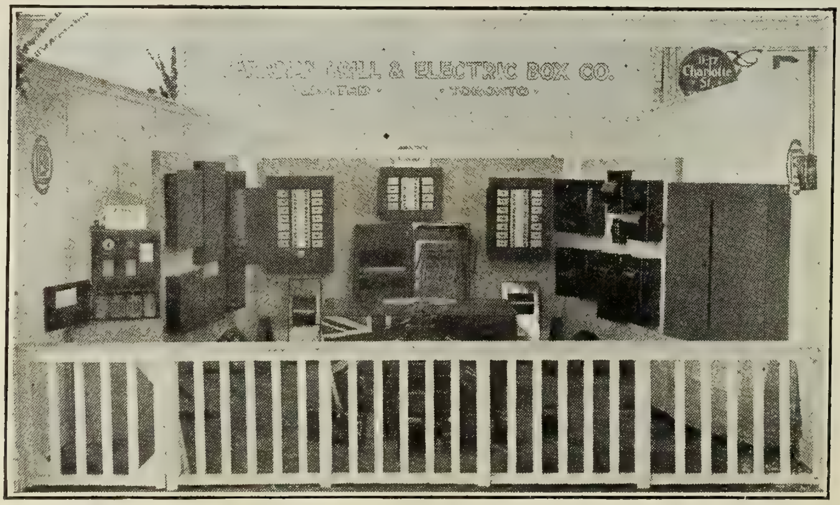
And All Types of Steel Cabinets

To ensure the greatest efficiency in your lighting installations, be sure you get Canadian Drill & Electric Box Co.'s products—they are made in Canada by Canadians with Canadian capital and comply with H.E.P.C. and Underwriters' regulations.



Make Our Exhibit Your Headquarters

We cordially invite electrical dealers to make our exhibit your headquarters when in Toronto during the Exhibition. Have your mail addressed in care of us and arrange to meet your friends at our booths.

Canadian Drill & Electric Box Co., Limited
1402 Queen St. East, Toronto, Ontario

New retinements on an old principal
See at Canadian National Exhibition Toronto
The New Model "K"

EASY Vacuum Electric WASHER

—the achievement of 42 years experience in building vacuum washing machines. Sales tell the story! The EASY is the Washer that saves more work than any other. That's why it is the machine women want most.

The vacuum cups gently force the soapy suds, air and water through fabrics without wearing them. The heaviest materials or daintiest laces are washed quickly, thoroughly and safely.

and now—
still greater improvements!
***Model "K"*—the 100% washer**

The specially designed 3-point suspension frame has been combined with a new base support making the EASY entirely self draining.

The mechanism has been improved and refined, adding new smoothness of operation and quietness.

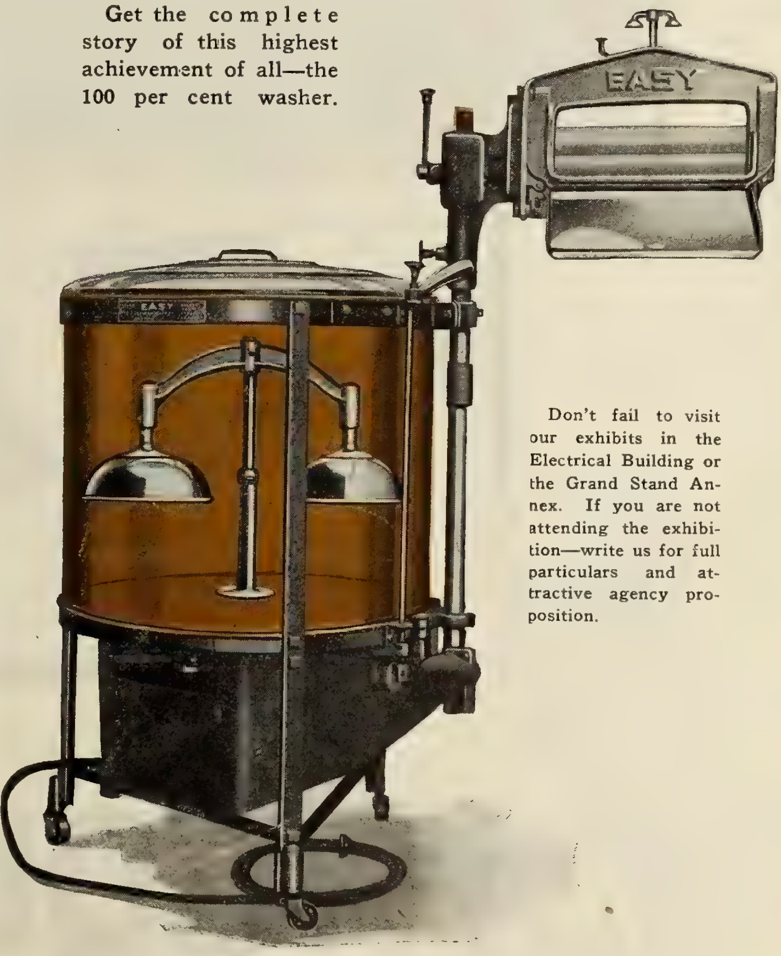
Examine the picture closely—see the switch, washer and wringer control handles—placed just where the hand most naturally rests—no leaning over to operate the EASY. The large open tub is EASY to load and unload; all smooth surfaces easiest to clean. All mechanism enclosed under the tub—out of the way.

The automatic oiling system is filled from the side, making oiling simple, and seldom to be thought of.

Notice the aluminum wringer—its beautiful lines, the extra long polished drainboard and the convenient safety release. Equipped with ball bearings—12 inch rolls and the smoothest operating reversing mechanism.

No wonder this is the machine women want most—and the beauty of it all is—the range of EASY prices enables it to compete with any washing machine on a low price basis.

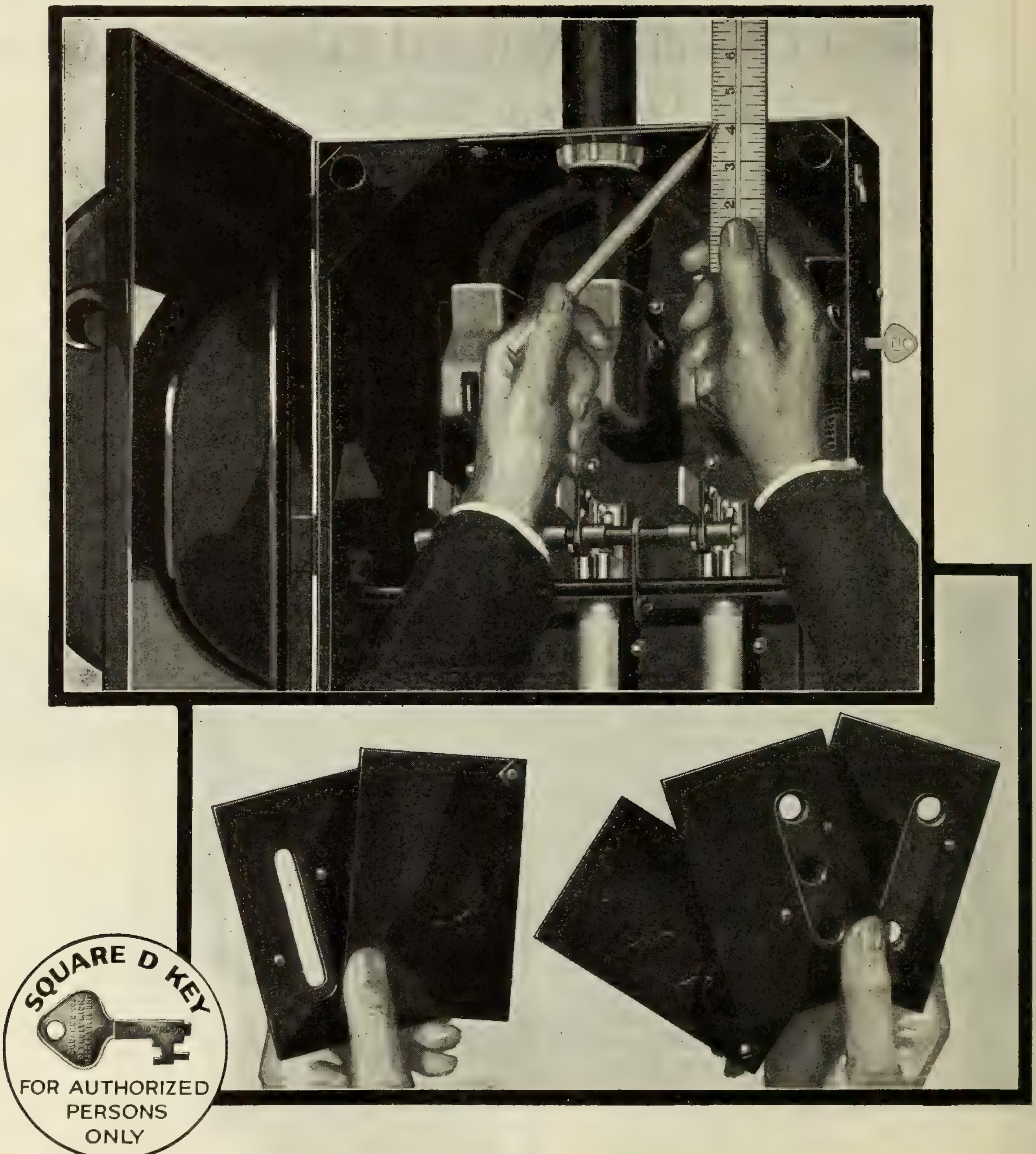
Get the complete story of this highest achievement of all—the 100 per cent washer.



Don't fail to visit our exhibits in the Electrical Building or the Grand Stand Annex. If you are not attending the exhibition—write us for full particulars and attractive agency proposition.

The Easy Washing Machine Company Limited, Toronto

Built for Quick Wiring and



SQUARE D

Inexpensive Installation

Ample Wiring Space and Easy-Wiring End Plates Make This New Square D Easy to Install

Not the least important of its numerous superiorities is the exceptional speed with which the new 80000 Series can be installed. In many switches the wiring space is so cramped that an average installation requires too much time and effort. How this is avoided in the Square D is illustrated on the opposite page where a 100 amp. switch is shown. In larger switches the wiring space is proportionately greater. Easy-Wiring end plates with porcelain bushings or clean cut knockouts are available for any kind of conduit or open wiring. A neater, quicker, less expensive job is the result.

Positive Operation—Low Maintenance

The unusually low maintenance cost connected with this new Square D is a result of several original advancements in design. The Square D Multi-Spring jaws give satisfactory contact with oversize or even blistered blades; they do not distort, can be easily realigned—and are in every way superior to the milled or punched clip jaw.

Positive contact is further insured by an insulated steel crossbar which cannot warp or char. It is operated by a quick make and quick break mechanism that is protected from the clogging action of dirt and grease.

All current carrying parts are mounted on individual bases of moulded insulating material instead of a single slate base. Any blade or jaw can be replaced in 3 minutes from the front of the box.

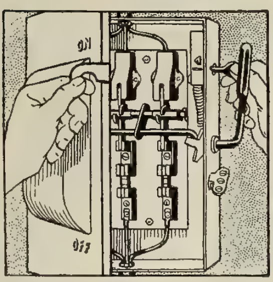
Square D Patented Cover Control

Unless the box is locked, anyone can open the cover when the switch is off and close the switch after shutting the cover. But authorized persons with the key can open the cover without interrupting the circuit and operate the switch with the cover open. This is one requirement that production men have long demanded. It is answered—for the first time—in this new Square D!

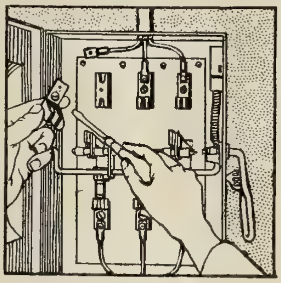
See the New Switch! Act Today!

If you want to see the new Square D and convince yourself of its unquestioned superiority, write or telephone our nearest office.

SQUARE D COMPANY, Walkerville, Ontario, Canada
Sales Offices at Toronto and Montreal
(17)



Only authorized persons having key can open the box when the switch is on

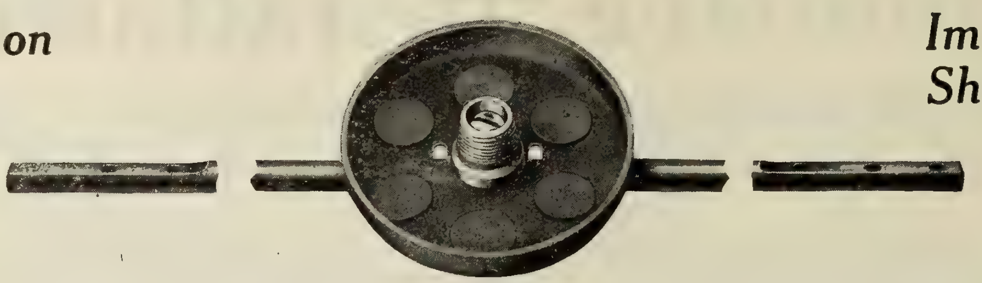


Individual bases permit removal of any blade or jaw in 3 minutes

SAFETY SWITCH

Samples on Request

Immediate Shipments



No. 1045

The No. 1045 box, was designed to meet local requirements for Ontario, but its good features have been seen by Contractors throughout the Dominion, as well as by Progressive Jobbers. It is now the **STANDARD LOOM OUTLET BOX** of the day.

Western Representatives
COCHRANE STEPHENSON & CO. LIMITED
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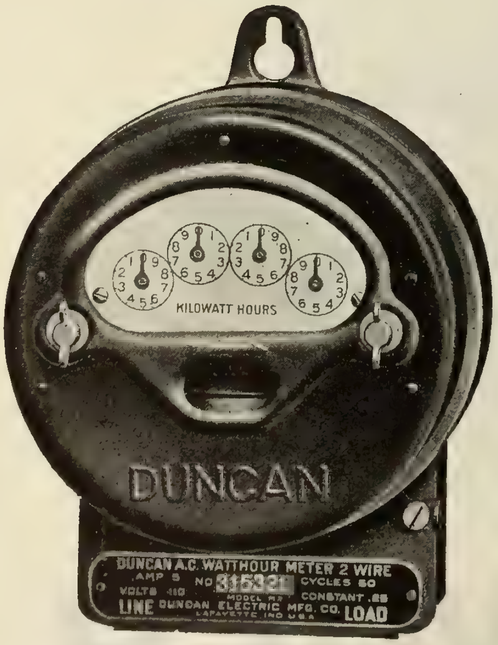
SIMPLICITY AND RIGIDITY OF CONSTRUCTION



The potential and series electro magnets of the

DUNCAN

Model M 2

are of the simplest possible form and their replacement is cut one-third to one-sixth the cost of others. Again, the manner in which these elements are fastened to the cast grid renders their getting out of alignment impossible; therefore, the Duncan Model M2, once right, always right.

THE GEORGE C. ROUGH SALES CORP'N. 134 CORISTINE BLD'G
MONTREAL

Building Business with O-B Insulators

Reliability of power supply rather than price has been the main factor in changing manufacturers over from their own to central station energy.

However important power cost may be in a business it is never so important as continuity of operation.

O-B Insulators have helped many power companies to build and to maintain a reputation for continuous power supply. In ever increasing proportions O-B Insulators are being utilized to protect the central station and the central station's customers.

O-B Insulators are worthy of all this responsibility which is being put upon them.

There are types for every service —in the station and sub-station—on transmission lines and distribution systems.

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Mansfield, Ohio, U.S.A.

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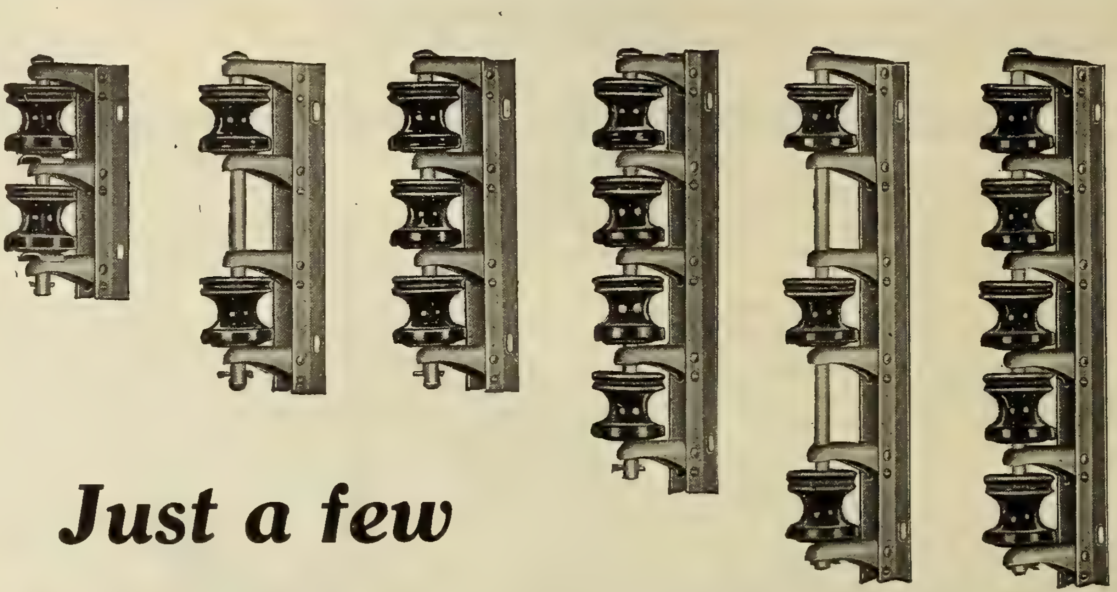
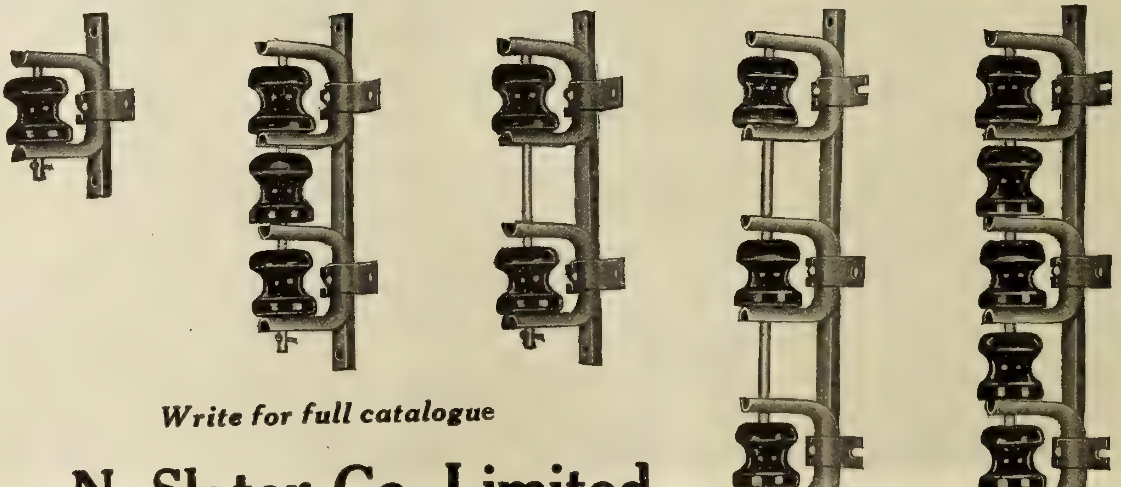
Products: Trolley Material, Rail Bonds, Electric Railway Car Equipment, High Tension Porcelain Insulators, Third Rail Insulators

N. Slater Co. Limited, *Hamilton*



Just a few

The *Peirce*



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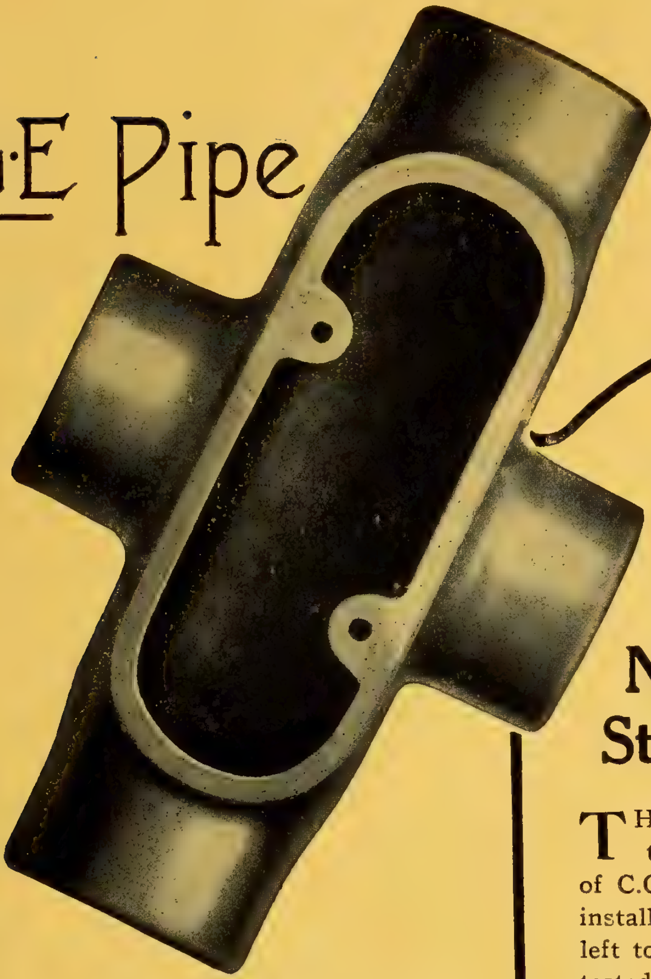
N. Slater Co. Limited

Hamilton, Can.

"The Hardware MAKES the Line"

C.G.E Pipe Fittings



Used on the New Toronto Street Cars

THE above fact is just one more testimonial of the superiority of C.G.E. Pipe Fittings. On such an installation as this, nothing could be left to chance. Only Pipe Fittings of tested worth could be considered.

When it is taken into consideration that there are ten separate and distinct inspections that C.G.E. Pipe Fittings must pass before they are allowed to be put into stock, it is no wonder that these Fittings have such an enviable reputation.

The above features are worth serious consideration when next you order Pipe Fittings.

C.G.E. Pipe Fittings are "Made in Canada"

Canadian General Electric Co., Limited

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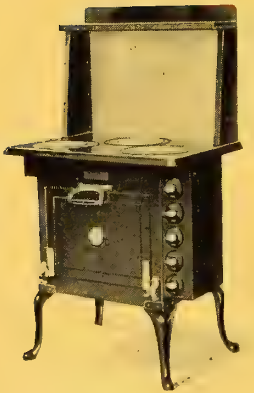
Branch Offices: Halifax, Sydney, St. John, Montreal, Quebec, Cobalt, Ottawa, Hamilton, London, Windsor, South Porcupine, Winnipeg, Calgary, Edmonton, Vancouver, Nelson and Victoria.

The New Hotpoint RANGES



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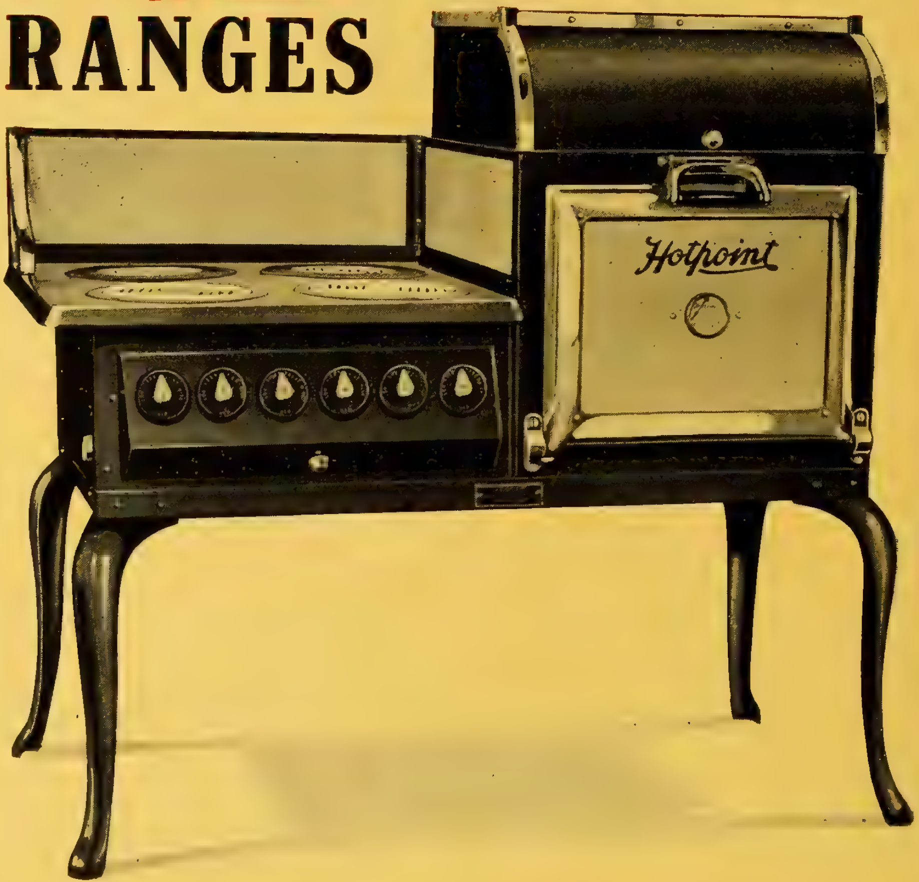

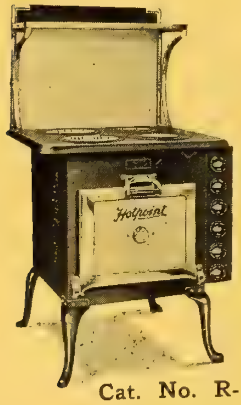

Cat. No. R-5

Cat. No. R-4

The R 8 has the SAME COOKING CAPACITY as the Standard Cabinet type Range with 40% LESS SURFACE to Clean ——

It is equipped with everything of the very latest and most up to date in range development.

The mechanical connections are of the most recent type with porcelain terminal blocks, and 3 wire single conductor cable to each unit. The surface elements are of the new spiral wound type—easily removable.

The oven has rounded corners, and an exceptionally smooth surface. Both units are hinged, and the oven racks are removable. The lining is of copper bearing steel, which will not corrode. All units are separately fused—fuses being readily accessible.

The warming closet is designed to allow practically the same clearance, when the door is opened, as the old No. 50 Range. No element is installed; owing to special construction of the oven, approximately the same temperature is obtainable as with a 600 watt unit, without loss of heat to the oven. The warming closet provides a shelf on top—no left hand models are required.

Each switch is mounted separately, and can readily be removed without disturbing the remainder.

"Made in Canada"

Canadian General Electric Co., Limited

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Hotpoint

HEDLITE HEATER

"Warms as the Sun Warms"

In view of the serious coal shortage, we strongly urge every electrical dealer to place his order for Hotpoint Hedlite Heaters immediately. It is obvious that there will be a huge demand for this device, directly the first sign of cold weather appears.

This Heater is of the radiant type, portable design.

The base is so weighted that if the Heater is tipped over, it will right itself immediately, thus eliminating any fire hazard. It is supplied with detachable cord and plug. Owing to the mechanical construction of the Hotpoint Hedlite Heater, the maximum amount of heat is radiated.

Let us know your requirements, as soon as possible, in order that we may give you the best possible service.

"Made in Canada"

Canadian General Electric Co., Limited

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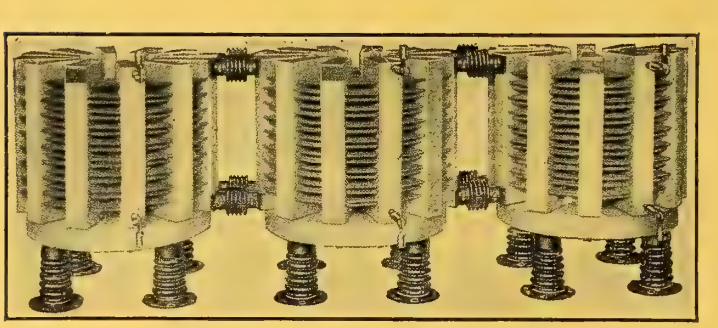
Branch Offices: Halifax, Sydney, St. John, Montreal, Quebec, Cobalt, Ottawa, Hamilton, London, Windsor, South Porcupine, Winnipeg, Calgary, Edmonton, Vancouver, Nelson and Victoria.

Protection is the Best Insurance

Short Circuit Protection

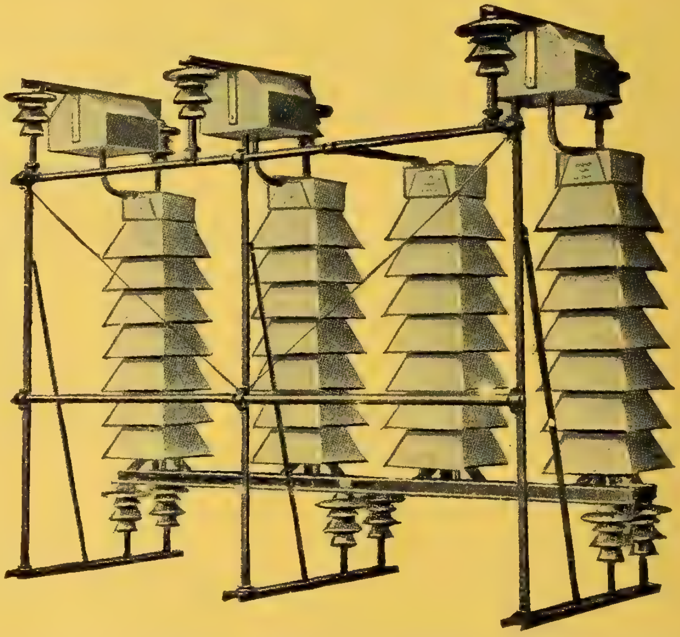


CURRENT LIMITING REACTORS.

If your system has outgrown the apparatus used for protecting the service against short circuits and other similar troubles, let us help you to find the best solution of the difficulty. It may be best to replace the oil circuit breakers with new ones that will take care of the worst conditions as regards rupturing capacity, magnetic stresses and instantaneous heating of contacts and joints or it may be best to limit the conditions by using current limiting reactors. The "Cast in Concrete" Reactor is superior to all other types in ability to withstand mechanical and electrical stresses and is not injured by severe rises in temperature.

Lightning Protection

The Canadian General Electric Company has a complete line of Lightning Arresters, Choke Coils and High Frequency Surge Absorbers, for all classes of service. Power Companies needing Lightning Arresters for high voltage lines should investigate our Oxide Film type which contains no liquids, does not require daily charging and which has the same operating characteristics as the well known Aluminum Cell type.



OXIDE FILM TYPE LIGHTNING ARRESTER WITH COVERED SPHERE-GAPS FOR OUTDOOR SERVICE.

Canadian General Electric Co., Limited

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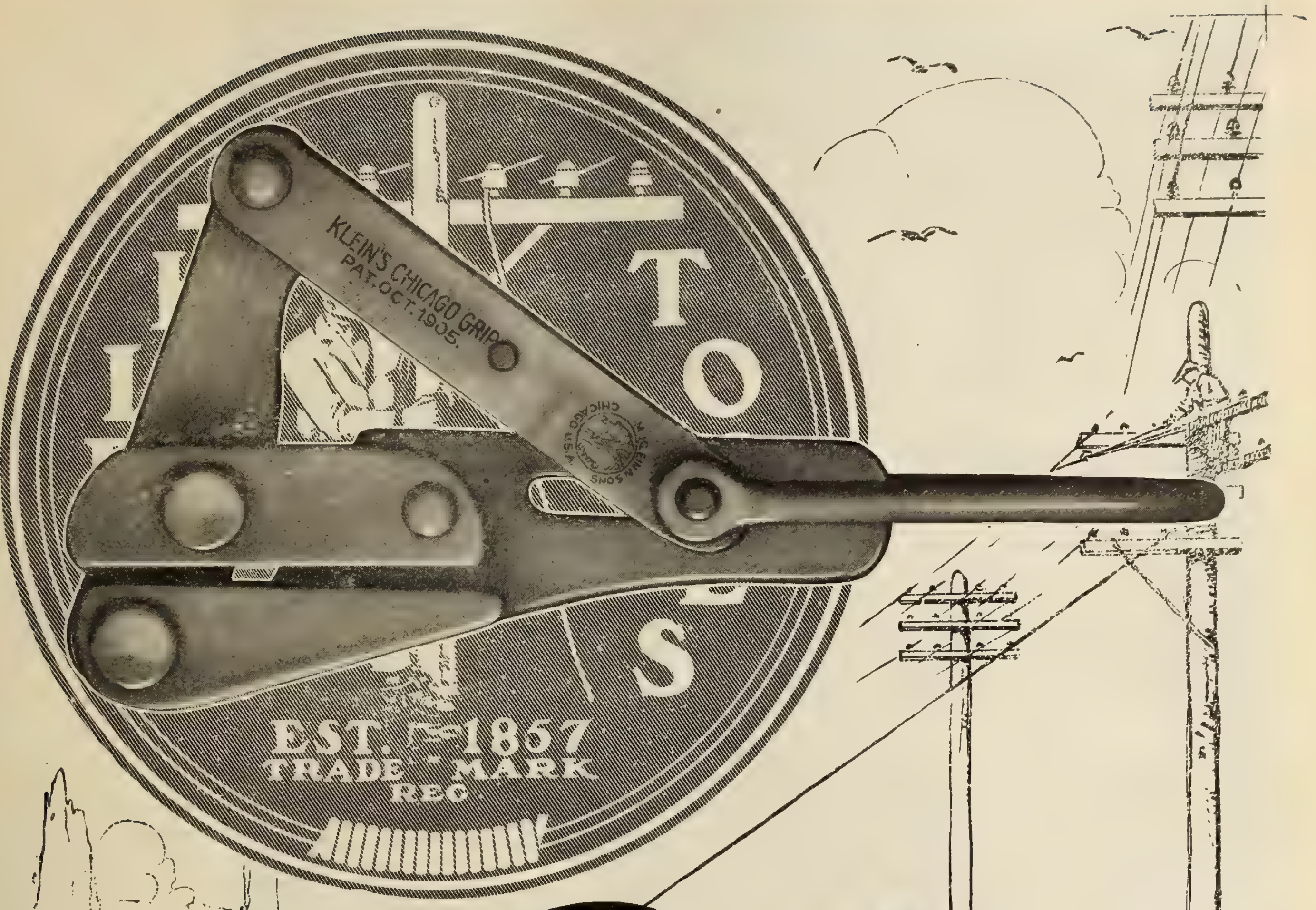


Grips

Good Grips! KLEIN GRIPS!

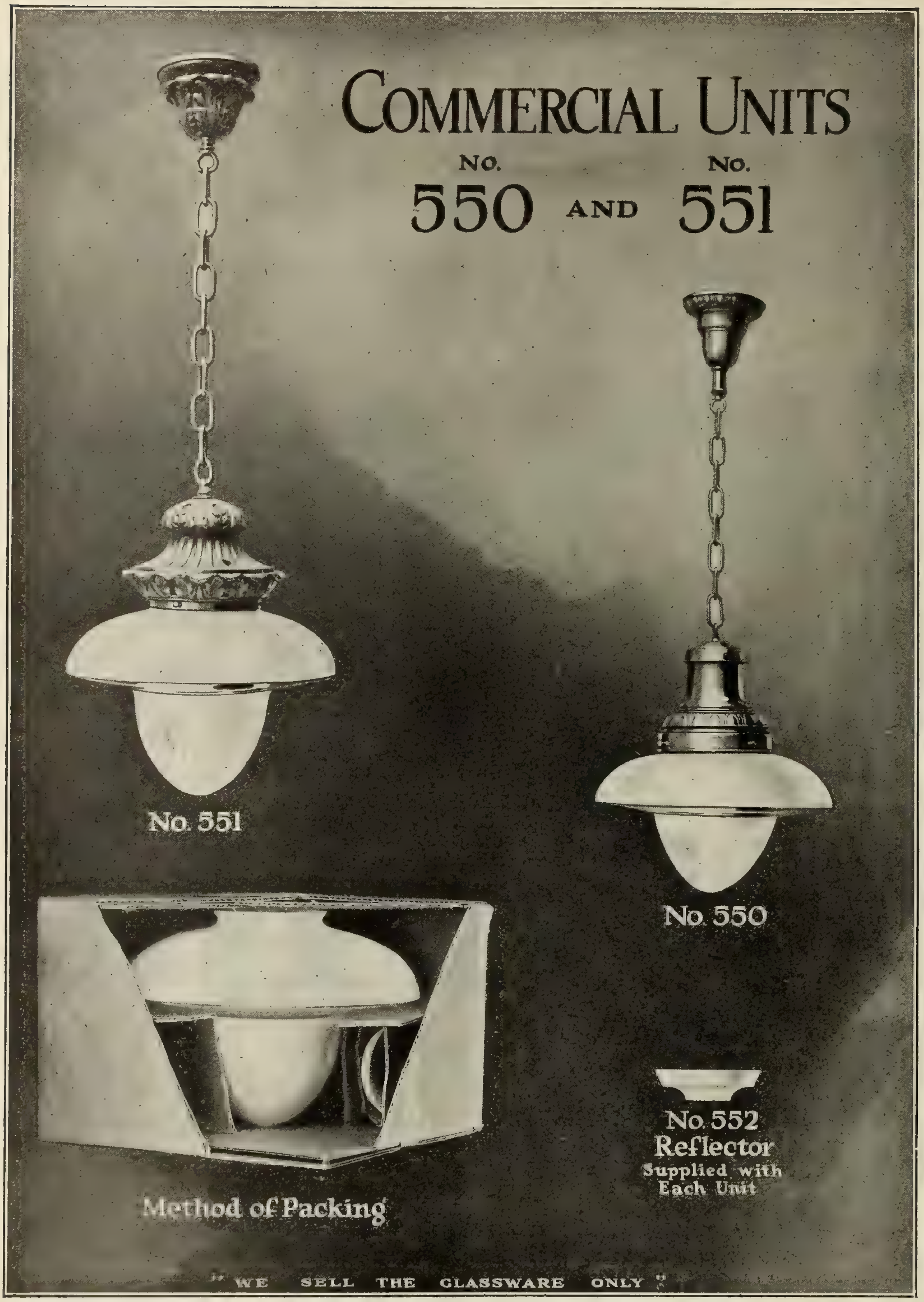
Equip your "construction gangs" with reliable grips—grips stamped with the Klein trademark. Built out of an experience of 65 years in the making of linemen's tools.

Klein Grips have been standard for years. They pull straight without putting kinks in the wire, and hold on with the tenacity of a bull dog.

Klein "Chicago" Grips are made from the finest of forged steel, gripping jaws are machine smoothed, rivets are machine turned and the drawing link is so placed that it will not hang down at right angles in the way of the line when the grip is on.

A complete line of Klein "Chicago" Grips, "Haven's" Grips, "Come-Along's," and linemen's tackle will keep you ready for "trouble." Look over your stock today!

Mathias KLEIN & Sons
Established 1857
Chicago, Ill. U.S.A.



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Absolutely Dust Proof

Adaptable to many styles of Ornamental Hangers

550—13″ diameter x 8½″ deep x 6″ fitter.

551—15⅞″ diameter x 11½″ deep x 6″ fitter.

We sell the Glassware only

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388 CARLAW AVE
TORONTO

DOWN-TOWN SHOW ROOMS
164 BAY ST., TORONTO

Jefferson Glass
MADE IN CANADA
COMPANY LIMITED

285 BEAVER HALL HILL
MONTREAL
272 MAIN STREET
WINNIPEG
510 HASTINGS ST. W.
VANCOUVER

We are manufacturers, in a large way, of

TOP PINS, SIDE BRACKETS, POLE STEPS AND CROSS ARMS

We have been supplying this pole line material for years, from coast to coast, to the largest telephone, telegraph and electric lighting systems.

Our goods are specified where efficiency and economy are measured by actual results and not by purchase price only.

THE LACHUTE SHUTTLE CO., LIMITED
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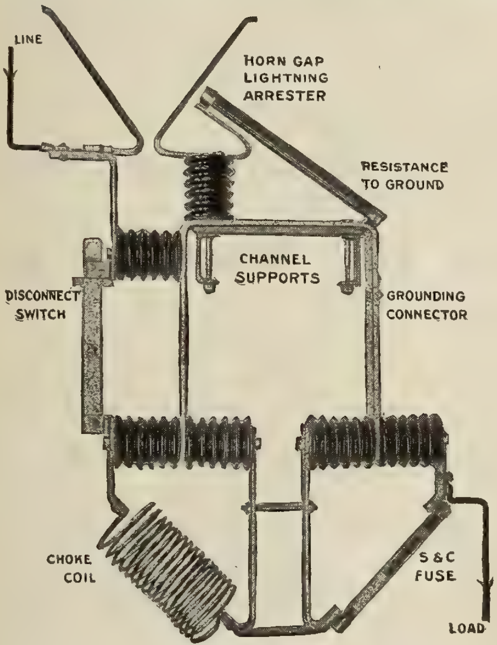

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Horn Gap Arrester with Series Resistance to Ground, Disconnecting Switch, Choke Coil and "S & C FUSE" Mounting.

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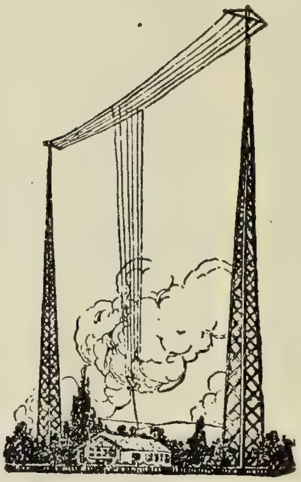

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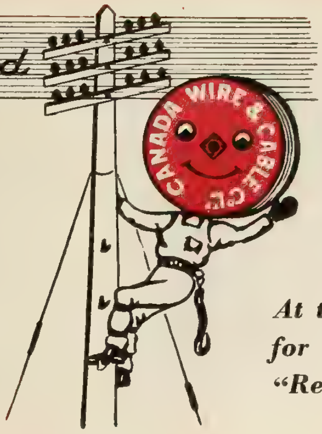
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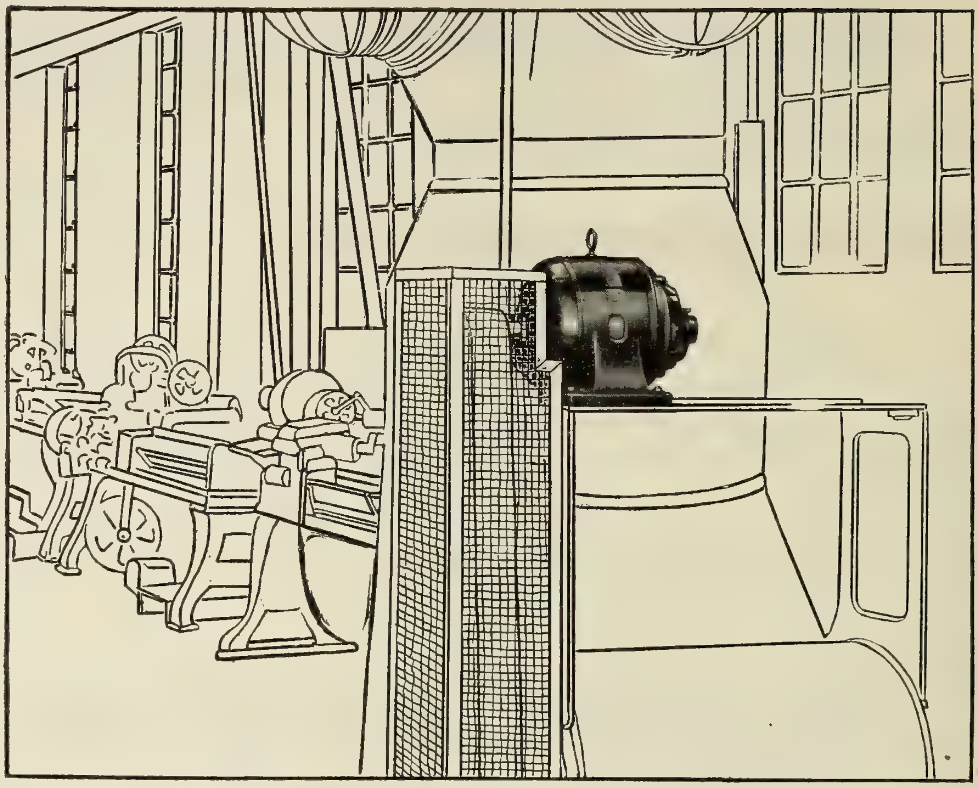
Wagner, Quality



This motor—located next to firebox
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THERE is probably no severer test of a motor's insulation than subjecting it to continuous heat day after day—as this one is.

To withstand such tests, Wagner,Quality motors are equipped with coils wound in phase groups without splicing connections, and impregnated with insulating compound after their insertion in the stator core.

This particular installation is one that brings to mind the insulation feature of Wagner,Quality motors. There are, however, thousands of other Wagner,Quality motors operating under circumstances equally severe where the burden is distributed over various parts of the motor.

Wagner,Quality motors are quality in every respect. The insulation isn't perfected at the expense of the windings, nor is performance at one point made possible by forsaking it at some other point.

Wagner,Quality motors are good, all-around motors that do the work intended, having a sufficient reserve to take care of those slip-ups that are not intended—yet happen once in a while.

Send for Bulletins 12213 and 12713, fully describing Wagner polyphase and single-phase motors, respectively.

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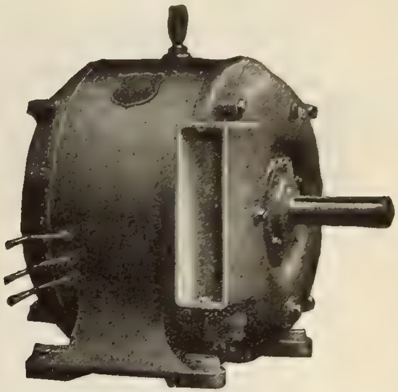

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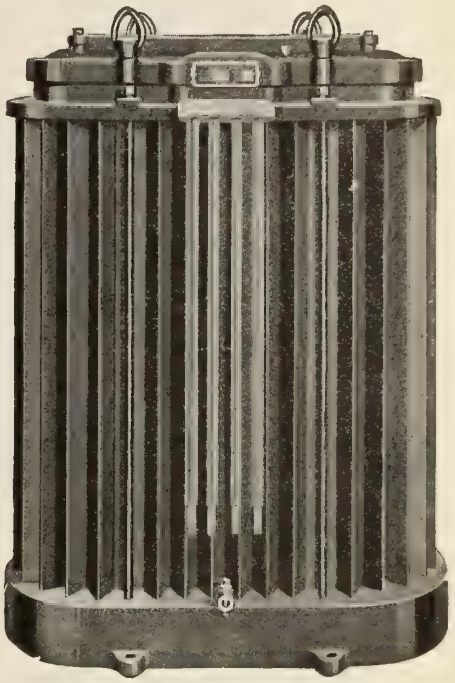

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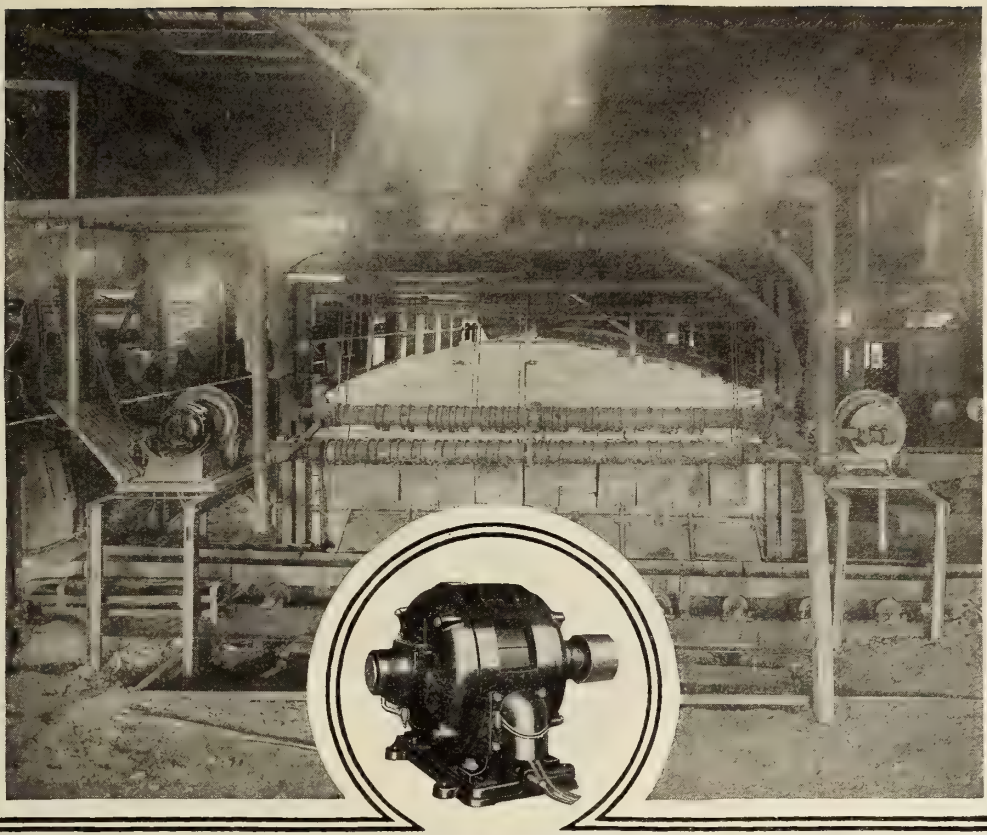

R & M Motors Operating Maxon Premix Burners on Rail Reheating Furnace

MAXON PREMIX burners are used in connection with furnaces in steel mills, glass factories, bakeries and other places of this sort where efficient, accurately controlled heating is required. The motors which operate the blowers are usually installed right at the furnaces where they are subjected to the hot, and frequently dusty, atmosphere of such surroundings.

For years the Maxon Premix Burner Company, and several other leading manufacturers of such equipment, have supplied R & M Motors on their appliances. They have found that the sturdy construction, liberal rating and low temperature rise of these motors make them especially suitable for such work.

Power users who require motors for severe services, as well as manufacturers of appliances which subject the motors to unusual operating conditions, find in the R & M Motor their best insurance against service troubles.

The Robbins & Myers Company
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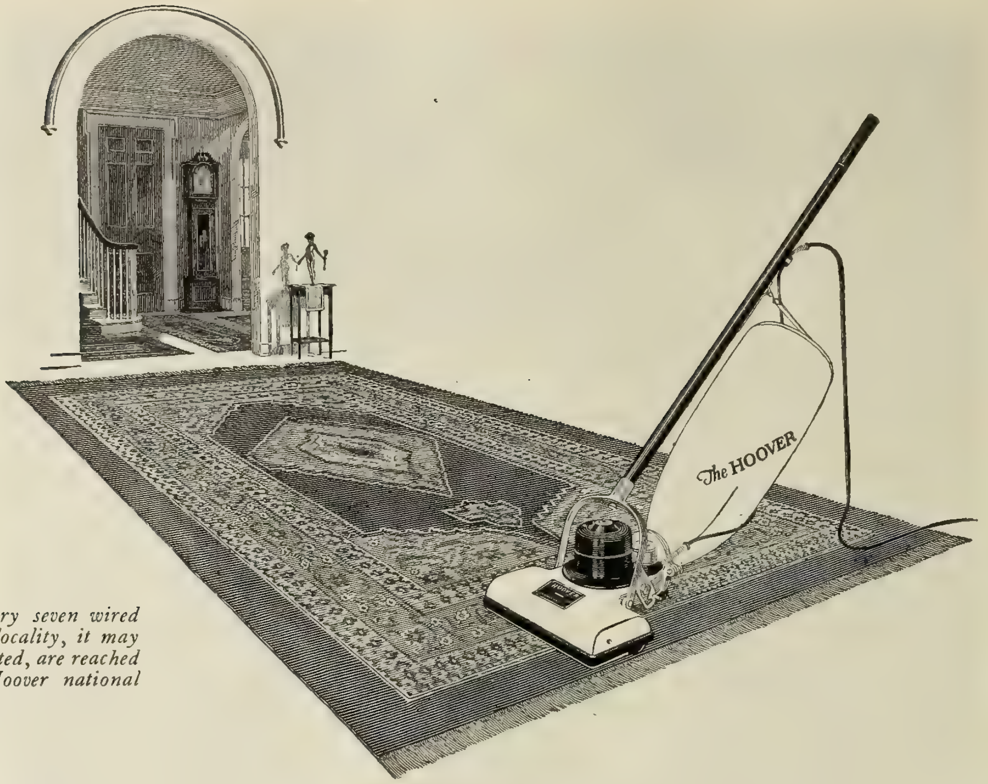
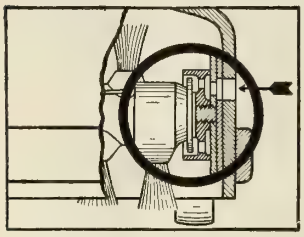
Robbins & Myers Motors



Five out of every seven wired homes in your locality, it may be safely estimated, are reached regularly by Hoover national advertisements

Prepare Now to Sell Hoovers this Fall



The Brush Ends Can Never Clog

(Another Patented Hoover Feature)

AN unprotected rotating brush will inevitably collect hair, threads, and similar materials which will in time mass and mat together at the ends in such a manner as to stop the brush and render the machine inoperative. This can never happen with The Hoover. By an ingenious utilization of strong air currents which are continually sucked into and swirled around the brush ends (as shown by the arrow above), all thread, hairs and other materials are prevented from catching upon the ends to clog or stop the brush. Covered by a Hoover patent granted June 18, 1918. Over eighteen patents now protect The Hoover. Other applications for patents pending.

Although Hoovers sell rapidly and easily during the summer, when the mercury runs high in the tube and women find it so fatiguing to keep their homes clean by old-fashioned methods, the coming of fall also affords a splendid opportunity.

For fall ushers in another house-cleaning upheaval—an event which every woman who is without a Hoover anticipates with dread.

Capitalize this opportunity for increased profits by becoming an Authorized Hoover Dealer and allowing us to assist you to plan and execute a successful Hoover House-cleaning Campaign.

Following house-cleaning season comes the Christmas gift-buying period. Every year great numbers of Hoovers are sold prior to Christmas, for gift purposes.

The present, therefore, is an ideal time for you to join forces with us.

Only a small investment and a small space in your store, coupled with a willingness to let us work with you and to utilize our experience on your behalf, are required.

On the famous Hoover Co-operative Plan, our trained sales organization co-operates with you to the extent of securing leads, demonstrating, selling, delivering and servicing Hoovers.

The Authorized Hoover Dealership can be made as valuable an asset to you as it is to so many other merchants. Write us today to send our representative to see you. There is no obligation.

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Generation, Transmission and Application of Electricity

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Vol. 31 *Toronto, August 15, 1922* *No. 16*

Industrial and Financial Outlook

"Conditions at the close of the first half of 1922 indicate that business will expand moderately during the autumn and winter months. It is now one year since the definite beginning of recovery from the depression of 1920-21. Progress was slow until the close of 1921, but since the beginning of 1922 improvement has been rapid. Money is cheap. The crop outlook is excellent. With few exceptions, stocks of raw materials and of manufactured products are not larger than necessary to bridge the normal period between production and consumption. Commodity prices are rising. The movement at present seems to be primarily one of adjustment between the different classes of commodities, and as long as the upward tendency does not assume a speculative character, it is a favorable factor. Except for strikes, there is little idleness. Production has expanded steadily since the beginning of the year, and as yet the usual mid-summer dullness has been little felt."

This latest summary, by the National Bank of Commerce, makes special reference to conditions in the United States, but these should not materially differ from our own. In many ways Canadian conditions are better. An example is the apparently saner attitude of Canadian "Labor" which has not allowed itself to be led into such disastrous strikes. Comparatively speaking, too, our wonderful crop prospects mean more to us, as our western provinces, where the bulk of the grain is grown, have been the weakest link in our credit situation. A good crop will work wonders in all directions and put "heart" into our rural population, where there has been little enough encouragment during the last two or three years.

As another indication of improving conditions, it is worth noting the course of the security market during the present summer. Bonds and stocks, in general, experienced a substantial revival during the first six months of the year and financial men looked for a quiet time during the holiday season, with the probable accompaniment of receding prices. As it has turned out, to-date, there has been little let-up in the amount of business transacted and little, if any, price recession. In a number of directions there have been quite marked advances. This indicates not only that the investor is regaining confidence, but also that he continues to have the money to spend.

There is another phase in the investment situation that is developing in the regular way. The very early stages of a trade revival are invariably preceded, financial statisicians tell us, by a demand for and a consequent increase in the price of high class bonds. At later stages when bonds become less attractive by comparison with industrial securities there is a gradual movement from municipal and government bonds to those industrials. This not only applies to the general investing public but also to the banks and other financial institutions, who in quieter times were quite willing to forego the larger financial returns in order to gain greater security but who, with the returning confidence, gradually relinquish their high class investments for more remunerative securities or so that they may be in a position to accommodate their commercial customers. At the present moment we appear to be well advanced in this second investment stage, indicating that we are following the natural cycle of former periods. With the increased confidence in industrials and larger sums of money available for development comes, of course, a quickened industrial activity.

Nobody looks for and nobody wants a boom, either industrial or otherwise. What we all want and need, and what we seem to have excellent prospects of getting, is a steadily improving condition, both as regards confidence, public demand for commodities, public ability to purchase commodities, and manufacturers' ability to supply them. There is no apparent reason to readjust the forecast we have already ventured in previous issues, that we are steadily moving to normal trade conditions, and will probably reach a condition of stability in the early part of 1923.

The Coming Convention of Contractors and Dealers

Plans are in progress for bringing the electrical contractors and merchants of the province of Ontario—and as many as possible from outside the province—together, in convention, on November 13th & 14th.

What will be accomplished?

Is it going to be the old time convention,—a number of papers read to empty chairs, a little disjointed discussion, a big banquet and much conviviality?

Or are these men coming to Toronto, with serious thoughts of the important nature of their mission and are they going to be met by a bill-of-fare that will send them home fitted to carry on their business like real merchants?

The weak link in the industry is the retail merchant. There are not enough of them and they are not sufficiently well trained. This is nothing to their discredit, for considering the length of time they have been engaged in retailing they have made wonderful strides; that is, they have made a good start, but that is no reason why they should not keep on improving as rapidly as possible.

It will be a fine thing if the contractors and merchants in the electrical industry come to Toronto in November and get acquainted with one another. They will profit by it. Still more, however, they need to get acquainted with up-to-date merchandising methods—such as are practiced by the best in other lines of trade. If they come to this convention as if they were coming to school, and if those in charge of the progam see to it that there are proper teachers provided, and if the discipline of a school is in evidence, with the social element kept in the back ground, more real good will result.

The fundamentals of retail merchandising are the same for all trades. In the shoe trade, the grocery trade, the hardware trade, the jewelery trade these fundamentals have been recognized and practised for generations. Why should we expect to acquire knowledge without experience or study? Why should we not "go to school" to those trades that have hundreds of years of experience behind them? Why should we in the electrical industry delay while the hardware man, the jeweler, the grocer and the druggist establish themselves as retailers of electrical equipment.

"Merchandising" is the weakest spot in our electrical anatomy. The November convention offers a splendid opportunity to improve the status of the electrical merchant by giving him two solid days of educational training in the fundamentals—such things as accounting, overhead, service, advertising, salesmanship, personality. Provide, as teachers, the most successful merchants to be found in Canada. Demonstrate that retailing is a science. Convince every delegate that he is engaged in a business that can be made to command the respect of the public while at the same time it will yield a fair return for all the investment in money, brains and energy that is put into it.

Face to Face With Prosperity

Winnipeg, August 8.—Grain companies, mills, railroads and the Lake Shippers' Association are just now feverishly preparing to handle what is expected to be the largest grain yield in the history of the Canadian Northwest. Rolling stock is being borrowed from eastern divisions and the banks are accumulating surpluses of cash at small branches from the lakes to the mountains in preparation for the big movement.

Official statistics from the grain exchange show the wheat acreage of the three provinces to be 21,146,000. In 1915 the acreage was 18,867,715. The average yield per acre then was 25.97 producing a yield of 360,187,000 bushels. The most optimistic, however, does not anticipate a yield so high this year. For ten years, however, the average has been 17 bushels. Upon this basis the yield this year would be 359,822,000 and this is the minimum that well informed sources expect will be produced.

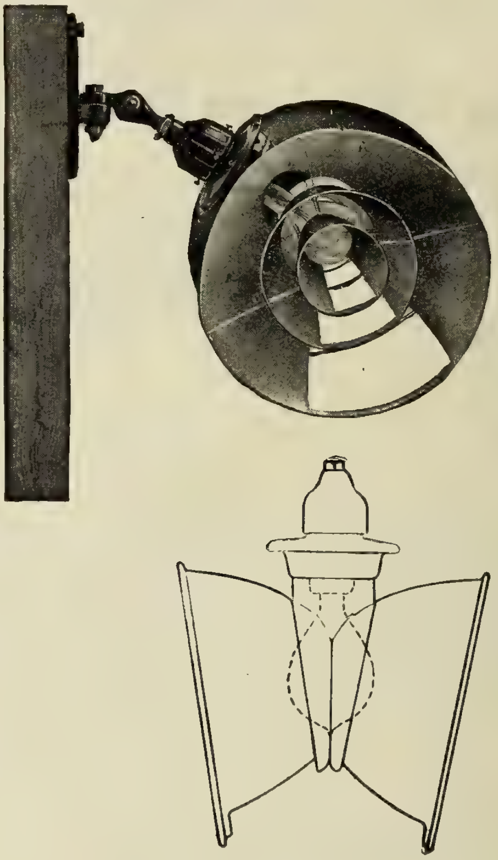
The question on October wheat, say July 10, 1915, $1.03⅜. July 10 this year October wheat quotation was $1.16¼. On the basis of this quotation this year's crop ought to yield at Ft. William, $417,393,520 or in cash, $47,250,000 more than the famous 1915 crop. The amount that would reach the farmers' hands would be, in cash, $327,438,000 because it costs 18 cents freight and six cents elevator charges per bushel to handle to head of the lakes. Approximately this amount of cash will be released through ordinary business channels in the west this fall.

Of course this is a debt-paying crop, but if conditions today continue it means that the books will be cleaned and all paper liquidated.

A Highway Lighting Fixture

A new fixture for highway lighting, that gives great promise, is shown in the illustration.

The fixture consists of a nest of 6 parabolic reflectors mounted in series of threes. A 250 candle power lamp is used. The reflectors are so arranged that practically all the light is driven outward along a narrow path which illuminates the roadway only, allowing no light to escape into the surrounding areas. These units are mounted about 30 ft. above the road-bed and from 300 to 600 feet apart. It is claimed that at any point on the road, so lighted, a fine print newspaper can be read with ease. The Central Station has an interesting article on this subject by Reginald Trautschold, M.E., of the Society for Electrical Development, and in this article some interesting figures are given.



C.G.E. A Highway Lighting Unit that gives much better average illumination with ten candle power

In the brightest lighted streets of first class cities, with lighting standards placed about 70 feet apart, the average intensity of illumination at breast level is .135 foot-candles, the maximum being .96 and the minimum .105 On residential streets, with an aggregate of 10 000 candle power per mile, the average is .068 foot-candles, the maximum .347, and the minimum .01. With the new highway lighting fixtures spaced 400 feet apart, the illumination intensity is .10 foot-candle on an average, .25 as a maximum, and .025 as a minimum.

These latter figures, it will be noted, are 48% higher on the average, 28% less for the point of maximum illumination, and 150% greater for the point of minimum illumination, than the figures for the well lighted urban residential streets. In other words—with 3,250 candle power per mile, using the new units, the lighting is considerably greater on the average and also much more uniform than when present day lighting of 10,000 candle power capacity is used.

The Application of Electricity in the Manufacturing Industry*---5

Almost Every Factory Uses Electric Heat—A Description of Heater Types Evolved for Various Purposes

The industrial oven or furnace consists essentially of some electrical resistor material and some heat insulation materials carried in a metal frame for their mechanical support.

The electrical resistor materials in greatest commercial use are:

(1) Nichrome. This is an alloy consisting of from 60 to 66 per cent. of nickel, 12 to 22 per cent. of chromium 26 to 10% of iron and 2% of manganese. Resistors made of this material have a maximum working temperature of approximately 1,800° F.

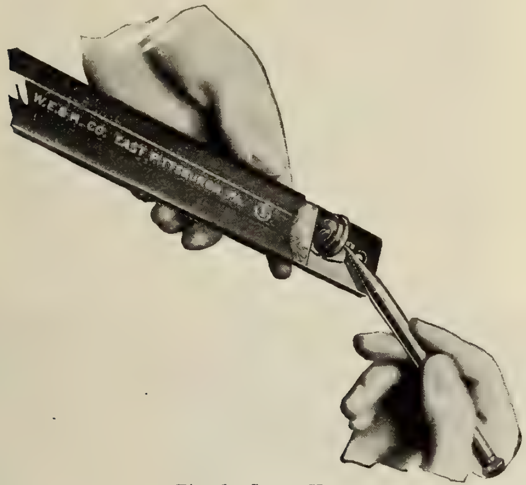


Fig. 1—Space Heater

(2) Chromel, or No. 1 chrome nickel alloy. This consists of 80% nickel and 20% chromium and contains no iron or other impurity. It is highly acid resisting and has high resistance to oxidation. Resistors made of this material have a maximum working temperature of approximately 2,000° F.

(3) Nickel steel, or ferro-nickel alloy. This contains 25% nickel and 75% iron. The resistors have a maximum working temperature of approximately 1,100° F.

(4) Copper nickel alloys. These contain from 45% to 65% of nickel and 30 to 55% of copper. The resistors have a maximum working temperature of from 900 to 1,100° F., and they have a practically negligible temperature coefficient of resistance.

(5) Carbon—granular or plate. These resistors have a maximum working temperature probably in the neighborhood of 5,500° F.

(6) Carborundum. This has been tried to some extent experimentally, but has not been a great success commercially.

Heat Insulation Materials

There are a great many heat insulation materials used commercially, such as:—

(1) Mineral wool—a product of silica, alumina and iron oxide, made by blowing a powerful jet of air or steam through melted blast furnace slag.

(2) Insulating bricks of various kinds.

As refractories, that is, close to the heating elements in high temperature furnaces, different types are used. Some of the insulating bricks weigh about 30 lbs. per cubic foot, whereas the refractory brick weigh about four times this amount.

Commercial Types of Heating Elements

(1) Grid heaters—nickel steel—for immersion in oils fats and greases.

(2) Cartridge type heaters. These consist of nichrome resistors, wound on fireclay insulation and mounted in brass shells of various diameters to fit different sized holes. The wattage runs from 75 to 1,000 per heater and the maximum operating temperature is around 800° F. These heaters are used in special machinery applications, largely in the rubber and shoe industries.

(3) Steel clad and space heaters. These are so named because the heating elements are encased in steel and are designed to economize in space occupied. Mica insulation is employed. For the space heater, a mica sheet is rolled into a tube onto which the nichrome resistance ribbon is then wound. The tube is flattened and terminals are placed at each end. The flattened tube is then placed in a mica sheath, which in turn, is placed in a heavy sheet steel sheath.

The space heater Fig. 1, is employed in a great variety of applications. It may be assembled in any desired number, depending upon the purpose for which it is to be used. One such as used in traffic regulation, industrial hot tables and particular use is for air heating purposes. Other applications of the space heater or steel clad heater are in foot-warmers,

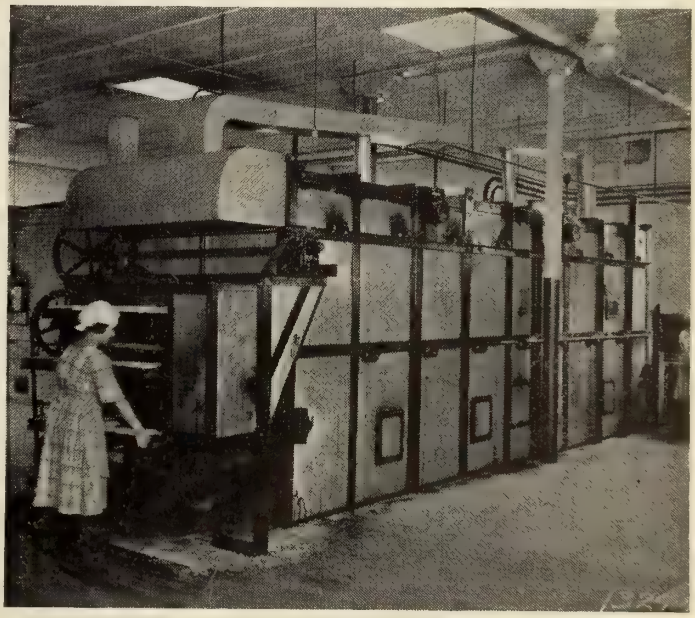


Fig. 2—Sectional type of electric bread oven

restaurant grills, heating of water tanks, mangle shoes, and heating of pattern plates in moulding machines.

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*For much of the information in this article we are indebted to a paper read before the Toronto A.I.C.E. by Mr. J. L. McK. Yardly, Westinghouse Electric Mfg., Co.

(4) Industrial oven heater. This consists of nichrome resistance ribbon wound on fireclay insulators and mounted in a steel rack frame of open construction. The element is made in various sizes from 1-3/4 to 5 kw. for 110/220 volts. The maximum operating temperature is around 900° F.

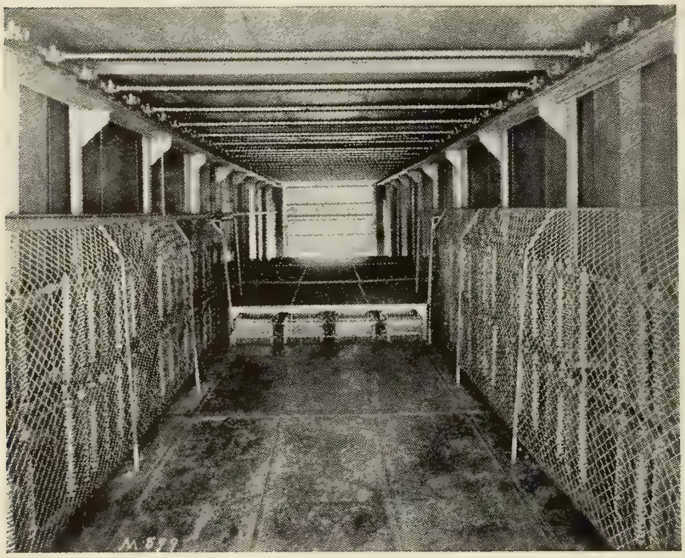

Fig. 3—An enamelling oven

Oven Control

As previously indicated, this is secured by means of the thermocouple and thermostat. For a small industrial oven installation a single section control panel is employed—for example, such as for a capacity of 40 kw. or the equivalent of 120 amperes, 3 phase, 220 volts. For larger oven or furnace installations, individual section control panels are grouped into a board. For example, 2,200 kw. of heaters at 550 volts employed in air heating in a large cotton mill of the Canadian Cottons Company, near St. Stephens, N. B., are controlled from two switchboards into which the individual sections are grouped. When grouping the control in this way, the sectionalizing switches are usually segregated at one part of the board and the main automatic control contactors at another part..

Types of Ovens

(1) Electric range for the household. In connection with this it is interesting to mention that over a test period of six months, the average monthly power consumption for 24 families of four to six persons each, under observation, was 100 kw.h.

(2) Bread baking oven—real type. One commercial size bakes 120 one-pound loaves in a 35-minute bake. This is equivalent to 175 loaves per hour. The input being 25 kw. seven loaves, or seven pounds of bread are baked per kw.h. The loss to maintain oven at temperature amounts to from 7 to 8 kw.

(3) Enamelling ovens—relative efficiency—mostly at 400 to 500° F.

(a) Kiln type oven--hand operated, 6 to 8 lbs. of work per kw.h.

(b) Kiln type oven—truck operated, 10 to 12 lbs. of work per kw.h.

(c) Semi-continuous conveyor type, 10 to 12 lbs. of work per kw.h.

(d) Continuous conveyor type, with air seal or exhaust fan, 25 to 30 lbs. of work per kw.h.

Bread Baking Oven

In the reel type, by rotation of the reel, every loaf is baked equally by the heaters located in the bottom of the oven. The oven is of course completely equipped with automatic control. The sectional type, Fig. 2, is made in several sizes of from about 20 to 60 and 100 loaves per second. The idea is for the baker to buy one or two sections or hearths according to his needs and then add sections later, as his bakery grows. Each section is heated from top and bottom and is provided with independendent automatic control.

Kiln Type Oven

This type of oven is largely used in the electrical industry and in the automobile industry. Fresh air coming in at the top and passing through the heating elements at the side of the oven takes up the vapors which are heavier than air and is exhausted from the bottom. This type of oven is also largely used in furniture enamelling. Lithographing requires a large volume of air on account of the drying nature of the process. Baffles with slits for admitting air to the interior of the oven are provided extending from the bottom to the top. The slits are arranged for directing the flow of air through the work.

Continuous Conveyor Type

This type of oven is also extensively used. A large oven is installed at the Royal Typewritter Company for the enamelling of typewriter frames. At the Buick Motor Car Company plant, an oven of 1,550 kw. capacity is installed. Fig. 3, gives an idea of the length of this oven. The heating elements are all protected by screens. On the entering end they are mounted on the side walls, while on the exit end the heaters are mounted on the floor. The reason for mounting them on the side walls on the entering end is that the work drips to some extent while passing through this part of the oven.

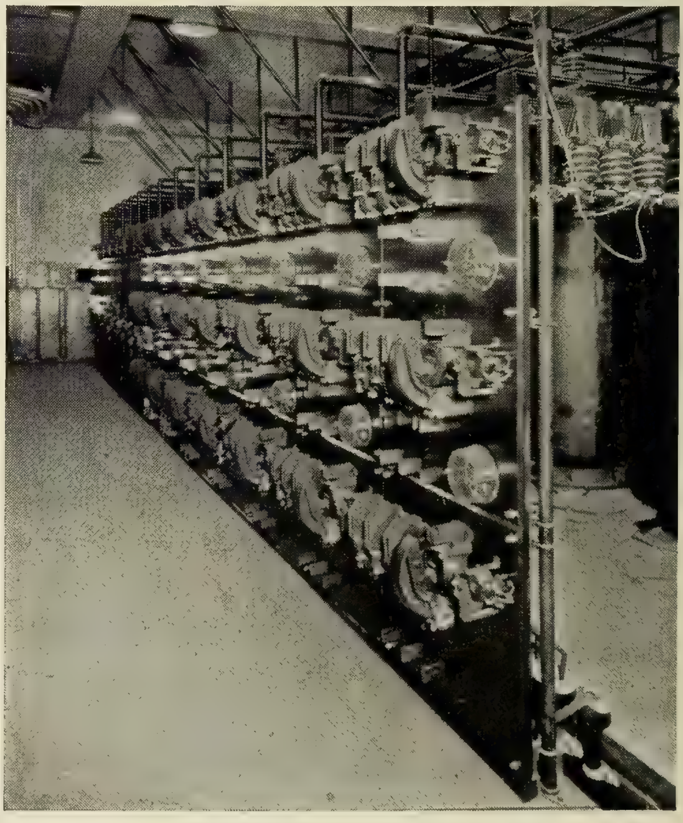

Fig. 4—Large oven temperature control panel

A very large oven of this type is installed in the Cadillac motor factory. Separate exhaust flues from the different sections of the oven are brought outside of the building. The automatic temperature control panel for this oven is shown in Fig. 4.

Solder and Babbitt Pots

A 30-pound, 3-heat solder pot consists of a cast iron shell, lined with 1-inch moulded insulation. The heating elements are directly underneath the cast iron pot, and are insulated by 1-1/2 inches of Nonpareil brick. The brick is placed directly in contact with the heating elements and above the wires so that all connections are amply protected. With terminals at the bottom, it is well arranged for conduit attachment. About 1,300 watts are required to bring a 30-pound charge to temperature in 55 minutes; 650 watts is ample to keep the charge at temperature. Fig. 5 shows a 750-pound solder pot under automatic control The thermocouple is in the rear and the electrical connections are at the right..

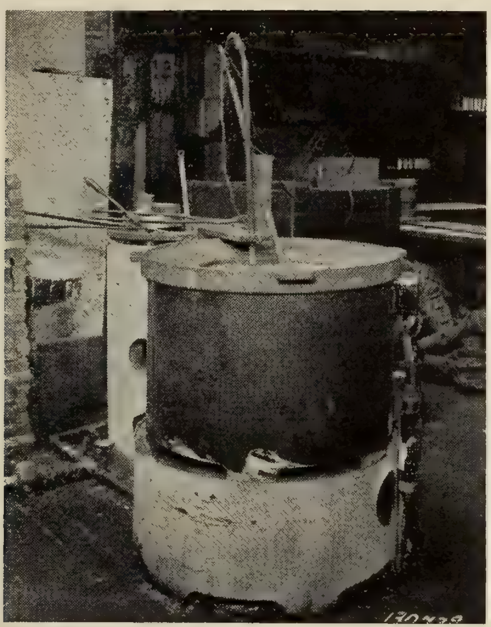

Fig. 5—An electric heated solder pot

Industrial Furnace—Heviduty Type

Furnaces of this type employ heating elements of chromel metal. These elements are placed in grooved refractories or muffle plates of special composition, which is a good dielectric and at the same time is a good conductor of heat. All terminals and connections between, heating elements are made on the outside of the furnace. Fig. 6 shows a small industrial furnace having an opening 12 inches wide, 19 inches long and 6-1/4 inches high. This furnace is for annealing and tempering and has a maximum demand of 9-3/4 kw. at 110 volts.

It is obvious from the type of construction that there is no reasonable limit mechanically or electrically to the size to which this type of furnace may be built. In the larger furnaces of course a substantial framework is required to carry the weight of the refractory and heat insulating brick. Fig. 7 shows a comparatively small annealing furnace of the Hevi-duty type. This furnace has two heating chambers, each 6-1/4 inches deep x 65 inches wide x 1-1/2 inches high. The heating elements with their special refractories are divided in three sections, one below the bottom chamber, one between the two heating chambers and the third just above the top heating chamber. This furnace is working on the heat treatment of turbine blades—about 200 pounds of copper per hour being heated to 1,200° F. In this case automatic temperature control is not employed and the furnace is operated at a considerably higher temperature than 1,200°. The attendant, however, watches the operation closely and quenches the blades when they have reached proper temperature. The maximum demand is 20 kw. at 220 volts.

The field for this type of furnace is very extended indeed, being limited principally by the fact that the resistor itself cannot be operated for any appreciable length of time over 2,000° F. Despite the business depression, an increasing number of these furnaces is being installed. Definite arrangements have been recently made for the installation of the following furnaces:

(1) 60 kw. furnace for treatment of wire.

(2) 210 kw. furnace for vitreous enamelling.

(3) 33 kw. furnace for lead bath treatment of steel saw blades.

(4) 220 kw. furnace of car bottom type for the heat treatment of locomotive parts—piston rods, crank shafts, etc.

Forging Furnace Carbon Plate Resistor Tpye

In searching for a resistor material which could be used in furnaces for application requiring temperatures above 2,000° F., and after a number of unsuccessful attempts had been made to use carborundum or silicon carbide for such work, a furnace was devised in which the resistor element consists of a pile of carbon plates held together by spring pressure. One of the earliest conceptions of this type of furnace is shown in Fig. 8. This furnace has been kept at a forging temperature of 2,300° F., for six weeks at a time and has been used in an extended operation, heading bolts. It takes from 16 to 40 kw. 1,000 to 1,200 amperes over a 20 to 60 volt range. In the operation of heading bolts, the input was from 16 to 22 kw. for small and medium sized bars. The carbon resistor plates are 6 inches x 2-1/2 x 1/4 inch thick and the pile of plates is held together by 200 pound spring pressure. The heating element has been found to handle 100 kw. safely. Water-cooled bronze terminals are provided. The roof above the element consists of four-inch x four-inch carbon bars covered by from 6 to 8 inches of carbon dust and two layers of ionsulating brick. Carbofrax and firebrick are used in the side wall. It was found that the element must be protected by oil or gas flame from oxidization in order to have reasonable length of life. One gallon of oil, or 100 cu. ft. of gas per day was sufficient.

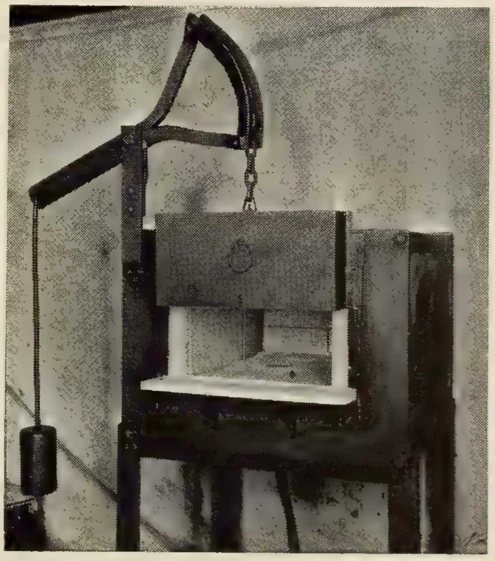

Fig. 6—An industrial furnace

High Frequency Inductive Heating Furnace

With high frequency inductive heating, temperatures above 2,550° F. are readliy obtained without carbon being essentially associated with the operation of the furnace. This type of furnace seems to have a multitude of applications. One of these is the melting of metals and alloys where low volatization losses are essential, as in the case of molybenum, platinum, gold and silver alloys. It may also be used in graphitization work. The carbon blocks to be graphitized are imbedded in lamp black or carbon black. It may also be used in the heat treatment of knife blades and thin steel sheets. One of the miscellaneous applications which have been suggested is in the manufacture of centrifugal castings.

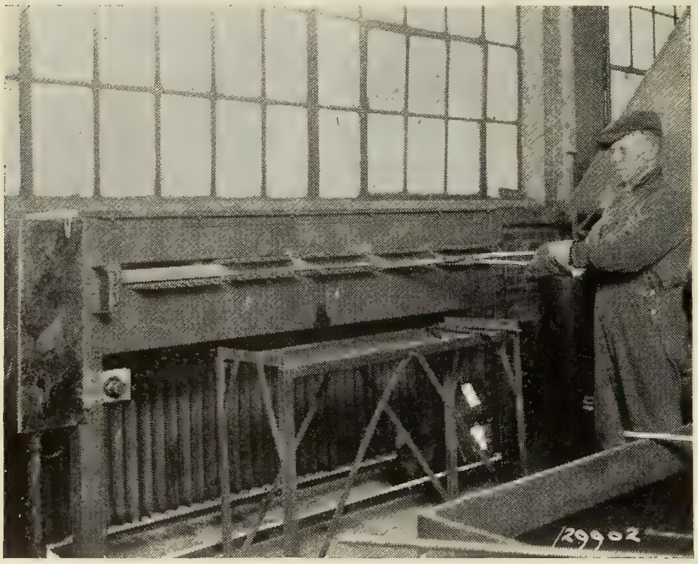

Fig. 7—An electric annealing furnace

In order to provide high frequency power required for this type of heating, a frequency converter is employed for sizes up to 20 kw. per phase, which consist of an oil cooled transformer with internal reactance, a set of static condensers, and a metal discharge gap. For larger capacities, it seems probable that a high frequency alternating current generator will be required. Such generators are obtainable and in fact have been built.

Industrial Heating Applications—Future

It seems unquestionable that the field of industrial heating by electricity will extend greatly, owing to the superior results of one kind or another usually experienced. It will accordingly extend particularly in the industries in which it has already started.

Glass annealing will undoubtedly be done to a much greater extent by electricity. A total possible connected load of 60,000 kw. has been estimated. In the textile industry, the slashers, tentering machines and singeing machines will probably be electrified, as well as the dye vats and various other applications. In considering the extension of electric heating into this industry, the following advantages have been indicated:

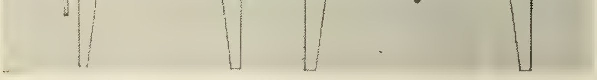

Fig. 8—Carbon plate resister type

(1) More uniform heating of liquids, dyes and size.

(2) More uniform consistency of liquids in dye vats, etc.

(3) Elimination of steam piping and its losses.

(4) Higher temperature, taking the place of additional dry cans in increasing production.

(5) Higher temperatures are desirable in calender rolls and more uniform temperatures throughout rolls than obtainable with steam or gas heat.

In the paper industry, particularly where power is cheap or waste hydro-electric power available, there should be further use of electrical heat. This will probably be in the clyinders of the board machine, in the calenders and in the general steam requirements.

Even the time honored lime kiln is likely to be invaded by the metallic resistor heating element some time when waste or cheap hydro-electric power is available. In the modern coal fired lime kiln, 500 to 1,000 pounds of coal are burned per ton of lime produced at a temperature between 1,100 and 1,650 degrees F. An electric lime kiln has been projected, employing metallic resistor heating elements in a locality where fuel for the fuel fired kiln is difficult to obtain, and some excess hydro-electric power is available, and it is expected to obtain a ton of lime at an expenditure of about 3,400 kw. hours.

At the present time the field of industrial electric heating has barely been touched upon. The applications which have already been made are many, but these have permeated only a very little way into the broad field of industry. Every factory, every workshop, indeed, every establishment that produces anything, of whatever nature, is a potential user of electric heat. A survey of the possibilities would indicate that the saturation point in this field is as far away as to defy calculation. Our electric power is abundant and cheap and our coal supply is not—a fact indicating that there is a wide market and a strong demand for industrial electric heating in Canada.

Ontario H. E. P. C. Acquires Power Rights; Some Rates Reduced

Following a meeting of the Ontario Hydro-electric Power Commission recently, Sir Adam Beck, chairman, issued a staement announcing acceptance by the Commission of a lease of the power rights on the Trent Valley waterways, from the Dominion Government, at an annual rental of $24,000 for a minimum of 6,000 and a maximum of 12,000 horsepower. The lease contains a conditional clause which guarantees that the agreement will not prejudice Provincial rights in the ligitation now pending between the Provincial and the Federal authorities over the disputed ownership of the waters concerned.

Preliminary announcement of important changes in the rates paid by consumers of Hydro power throughout all sections of the Province where the Hydro operates was made recently. Reductions in domestic, commercial and power rates to consumers will affect 67 municipalities, while increases have been made in 46. The Commission has also made a strong bid for the revenue now accruing to the gas companies from the sale of gas for cooking purposes by reducing the follow-up rate on power sold for domestic consumption from a maximum of 4 cents per kilowatt-hour to 2 cents. This change involves 48 additional municipalities, all of them outside of the cities, and brings into force the 2-cent maximum for this form of service over the whole of the Province. During the interview in which Sir Adam announced the changes, the Hydro head stated that this move had as its object the stimulation of the use of electrical appliances of all descriptions.

Thermal Load Indicators for Transformers

Burnout Losses Might be Avoided to a Great Extent if Accurate and Continuous Knowledge of Maximum Load Could be Obtained*

For various reasons distribution transformers are fused to-day from 100% to 200% over their capacity. On this account there is a considerable loss through burnouts which might be avoided if accurate and continuous knowledge of the maximum load on them can be obtained. We watch our generators and power-house transformers closely, and protect them with relays, but the distribution transformers have not received a proportionate amount of attention.

It is well known that a transformer operated near the safe maximum temperature has its life considerably shortened. With new usages of electricity, such as range and appliance loads, becoming more pronounced, this may easily occur when the method of testing the load at the supposed peak period is followed. A test made on a winter evening would not show any load on the network due to ranges, toasters, etc. There is also a certain percentage of loss due to damaged insulation, caused by surges or lightning that I am convinced takes place over a reasonable period of time, enough to allow a damaged transformer to be located and removed for repairs before the trouble has gone far enough to require complete re-winding if an inspection could be made shortly after a thunderstorm in the vicinity.

A real need exists for a simple piece of apparatus that can be attached to each transformer permanently which will give an indication of overload or trouble in the transformer.

The practical limit of loading for distribution transformers is reached when the bottom spot in the transformer reaches the safe operating temperature for the class of material composing it. It is difficult in the field to actually measure this, and the next best place to get an indication of this temperature is from the oil. There are two main variables in the relationship between oil and hot spot temperature; construction and ambient temperature. The effect of the latter is to a certain extent dependent on the former, but it is not difficult to find the allowable maximum oil temperature under the most adverse conditions for any type of transformer. From the oil temperature it is possible to obtain a constant indication of the loading of any transformer, and devices coming on the market accomplish this in two main ways, positively and negatively. That is to say, they measure the actual temperature in degrees, or indicate that a predetermined temperature has not been reached.

There are other devices which operate on the electrical input or output on a thermal basis, giving a record of the highest load over a specified time period.

The chief requirements of a permanent device to indicate transformer loading are:—

(1) Low first cost.
(2) Reliability.
(3) Positive indication.
(4) Low operation and maintenance cost.
(5) Easy calibration.
(6) Easily read and re-set.
(7) Simple and waterproof installation.

(1) Low First Cost.—The amount that can be spent to fully equip a system of transformers, inspect, and keep a suitable system of records, needs to be carefully worked out in each individual Company from their costs of any testing or load record system in force at present, and a careful analysis of the yearly transformer losses to separate the avoidable ones; only these should enter into this part of the calculation.

As an example.—When the company operates an efficient transformer repair shop, the cost of any load testing system in force plus 50% of the value of the avoidable burnouts would give an annual amount which could safely be spent on a thermal protective system with the expectation of saving. That is, the carrying charges, interest and depreciation on the value of the devices, plus the annual operating and maintenance charges, should be less than the aforementioned sum.

(2) Reliability.—A high order of accuracy is not essential, an indication within 5 degrees C.—will be within the error in the assumed difference between hot spot and oil temperature; particularly if the ducts become clogged, or in zero weather.

(3) Positive Indication.—Fully as valuable information as the knowledge that a transformer is overloaded is available when the load carried has been indicated by the temperature, as underload transformers are easily picked out, and put where they can be worked nearer capacity.

(4) Low Operating-Maintenance Cost.—The indication of the device should be easily seen from the ground to allow of quick inspection. The device should be rugged, to stand shipment with the transformer, and movement of the cover for oil inspection, changing taps, etc.

(5) Easy Calibration.—The device should be easily set to operate at any temperature when it belongs to the negative class.

(6) Easily Read and Reset.—This does not apply to the negative class read from the ground, but where the indication is positive it must be kept in mind that the device will probably be read and reset by a lineman wearing spurs, with only one free hand.

(7) Simple and Waterproof Installation.—The device should be easily installed in the field on transformers already in service.

The various devices available at present for this work are as follows:—

Electrical.—Lincoln Demand Ammeter.
C.G.E.-H 2 Ammeter.
Negative Class.—"Standard" Semaphore.
"Westinghouse" Semaphore.
"C.G.E." Thermotel.
Positive.—Clinical or Stricture Thermometer.
Packard Transformer Temperature Signal Thermometer.

An issue of $450,000 Matchewan Power Co., Ltd., first mortgage 7 per cent 15-year sinking fund gold bonds is being offered at 95, with a bonus of 20 per cent of common stock.

Arthur Vilbert Burr, aged 33, of 80 Brownlow Avenue, Toronto, died recently. Deceased was born at Bloomfield, and attended Hamilton Collegiate and McGill University. He graduated as an electrical engineer in 1913. He had been employed by the Canadian General Electric Co., and the Firestone Tire and Rubber Co. At the time of his death he was an electrical engineer in the employ of the Herbert Morse Crane and Hoist Co., of Niagara Falls, Ont.

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*From report of the Overhead Systems Committe, C.E.A. Convention.

Long Distance Telephone Service Extended to the Northern Parts of Manitoba

F. W. BROWNELL*

One of the most interesting parts of the Province of Manitoba is now receiving telephone service which brings the people who are residents of that place in much closer touch with the more settled areas of Manitoba. I refer to the Long Distance service which has recently been extended and is now serving in the way of toll stations at three points on Big Island, viz., Danielson, Hecla, and Gull Harbor.

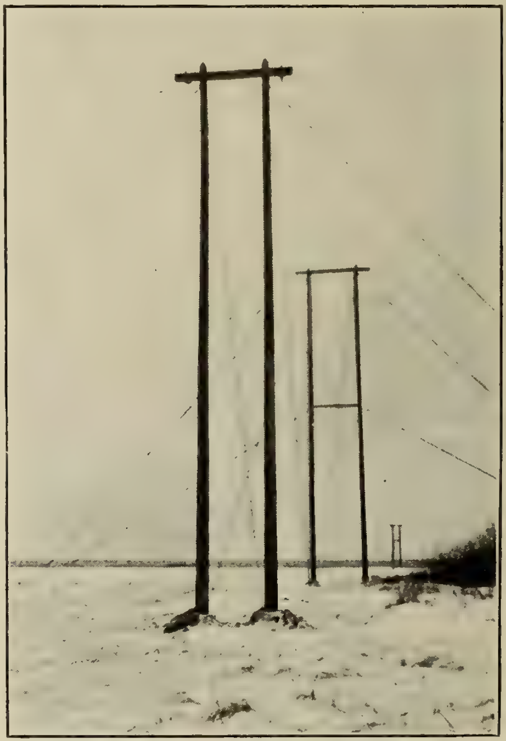
A view of the line in wooded country

Hecla Island, better known as Big Island, is in Lake Winnipeg. Its western shore is in close proximity to the mainland, near the post office of Howardville, which is nine miles north of the town of Riverton. This is the terminus of the Canadian Pacific Railway line north of Winnipeg, known as the Winnipeg Beach Sub-division. The island is seventeen miles in length and of an average width of three and one half miles. The western shore is low with hay flats and marshes, but the eastern and southern portions is more elevated and better adapted to farming and stock raising. The higher parts are well wooded with poplar, spruce, birch, etc. The shore is underlain by limestone, which crops out at the north portion of the island. The remaining soil consists of a re-assorted glacial deposit, clay with some sand. Boulders are seen on the shore, especially to the south. Shoals occur south-west of the island, extending at least two miles from the shore. Nearly all surveyed sections are occupied by settlers of the Icelandic colony.

This island is particularly interesting by reason of the fact that it affords a stopping place to the many activities of the great north country, which on account of its isolation and sombreness into the great unknown, so to speak, always arouses ones keen interest and imagination, and after a few trips into its great wastes one always feels the magnetic allurement of returning again.

On the east coast, from Danielson to Gull Harbor, there existed as road only a winding trail, and before a pole line could be staked out arrangements had to be made with the Municipality of Bifrost to have a proper road surveyed and registered. This being done, a road with an average width of thirty three feet now exists.

Between Hecla and Gull Harbor, on account of the limestone formation, the pole holes had to be blasted. This involved the use of explosives, and a small crew of men who were familiar with that work were engaged.



Crossing poles well guyed and anchored

The most interesting feature in connection with this project are the aerial crossings which were erected to span the Grassy Narrows. The crossing at the West Narrows is six hundred and eighty feet and the crossing at the East Narrows is eighteen hundred feet. On the shorter crossing sixty-foot poles, arranged "H" fixtures, were used. On the large crossing, in addition to the dead ending "H" fixture poles, "H" fixtures of ninety-foot spliced poles were used for supporting suspension insulators. No. 8, B. W. G. special galvanised steel wire, with a breaking weight of not less than four thousand pounds was used on this crossing. The crossing poles have been well anchored and guyed, there being used for the two crossings a total of thirty six seven-foot anchors. The poles in each case were placed at a depth of eight feet, the formation at this depth being hard clay. The construction work north from Riverton necessitated a great amount of tree cutting, and at many points it was necessary to brace the poles by reason of the pole line going through muskegs. In digging the pole holes through these muskegs fourteen-inch Iwan post hole augers were used to excellent advantage. By use of these augers the soil is kept intact and the pole is immediately set before any quantity of water fills in.

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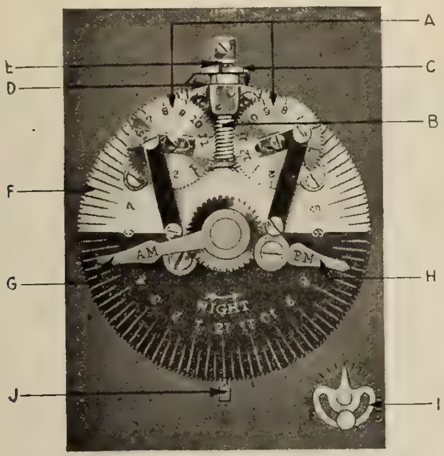
*Superintendent of Construction, Manitoba Telephone System.

A Street Lighting Time Switch that Allows for Seasonal Variation

In the course of an address delivered by Mr. M. B. Hastings, of A. H. Winter Joyner, Ltd., before the recent convention of the A.M.E.U. at Niagara Falls on the subject of "Modern Street Lighting," the speaker described a new development in an automatic time switch, specially designed for turning street lights on and off at predetermined times.

The ordinary automatic time switch has to be set periodically according to the lighting schedule, which is regulated by the varying seasons. The interesting point brought out by Mr. Hastings was that there is now available what is known as the "Season Changing Device," for the Anderson electrically operated switches. This device follows the sun and automatically controls the clock mechanism, so the lights are turned on and off at the same time, relatively, throughout the whole year. The following details covering this switch, taken from Mr. Hastings' remarks, are of interest.—



Season changing device

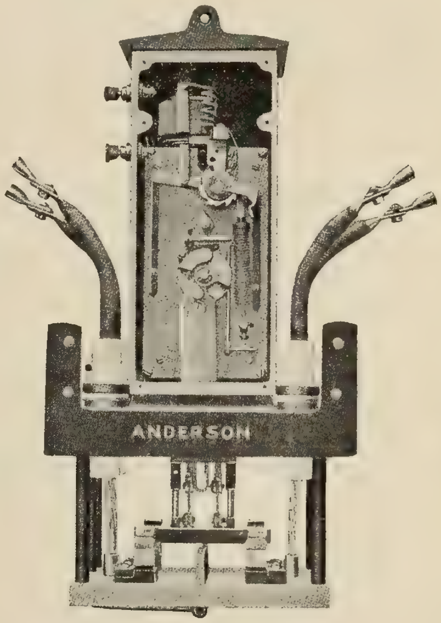
"When the time switch leaves the factory, the season-changing device has been adjusted for correct operation at the latitude where the switch is to be used, if known. Otherwise it is adjusted to the latitude of Boston—approximately 40 degrees north latitude. The latitude changing is done by lengthening or shortening of the cranks on the two small dials "A." This can be done by first loosening the center screws, when the cranks may be moved in or out, as required. This adjustment is difficult to accomplish, and should not be attempted in the field, but should be done before the switch leaves the factory.

"After some time has elapsed between the date of shipment of switch and the time of putting the same in service, it will be necessary to adjust the season-changing device to the correct date when the switch is started to operate. To facilitate this adjustment, the two dials "A" are numbered from one to twelve, indicating the months of the year. These dials "A" may be turned to any position by revolving the screw "B" with the wheel "C," and should be done as follows:—

"First, turn the screw "B" until the pointers "D" are at the numbers on the dials "A" that correspond with the month of the year at the time the device is put into operation. Then turn the wheel "C" to the right one-fifth of a revolution for every day of the month that has passed, previous to the device being put in operation. Then turn date of setting the device. For instance, if the device is to be set to start operation on September 4th, wheel "C" should be turned until the pointers "D" point to the figure 9 on the dials "A." Then turn wheel "C" to the right four-fifths of a revolution, and the season-changing device will be correctly set for September 4th.

"The bearing of the screw "B" is provided with a frictional stop, so that each fifth of a revolution—which represents one day—can be easily detected. The wheel "C" has five teeth, each of which represents one day, which further simplifies this adjustment. Always see that the wheel "C" is left with one slot toward the front, as otherwise the pin "E" that engages the wheel "C" would become disengaged, which would stop the operation of the time-switch. This pin "E" also acts as a pointer for indicating on the 24-hour dial the time of day. As part of the dial "F" is covered by the season-changing device, an additional pointer "J" is placed at the lower edge of the dial "F" to make easy the proper setting at correct time, of the time switch. To set the clock at the correct time turn the 24-hour dial to the left as indicated by the arrow.

"The two pointers "G" and "H" are for setting the switch at the desired time of operation, and are frictionally connected to the levers that operate them, so that they can be moved to the desired position easily with the fingers. One of these pointers is marked "A.M." and the other "P.M." to indicate which should be used for morning and evening operation.



The Anderson electrically operated switch

"The regulating lever "I" is for regulating the clock. To do this, loosen the thumbscrew and move the pointer either towards "F" (fast) or "S" (slow), as desired.

"When correctly set in accordance with the above directions, the instrument will follow the sunrise and sunset with a maximum error of about fifteen minutes from sunrise on August 15th and a similar error of fifteen minutes for sunset on May 15th, but will be practically correct on December 15th and June 15th."

A Dominion Convention of Electrical Contractors and Dealers will be held in Toronto on November 13th and 14th.

Radio Reception on Moving Trains

Canadian National Railways are Experimenting with Receiving Apparatus on their Toronto-Ottawa Trains and have met with Encouraging Degree of Success

By J. D. McLELLAN*, B.A.Sc.

Radio communication is still in its infancy. Much has been learned in the past few years of its wonderful possibilities, but there still remains an enormous field for research. One of the uses which offers a large scope for investigation is the application of this method of communication to moving vehicles. In the near future it will be possible to drive along a country road to the tune of a concert being broadcasted by a station a number of miles distant, or to ride in a railway train and listen to a speech which is picked up out of the atmosphere as the coach speeds along at 60 miles an hour. It will be possible to send messages to friends and to business associates from railway trains and to receive messages sent which have been picked up by the radio receiving apparatus on the train.

The Canadian National Railways are endeavoring to accomplish this by running a series of tests and experiments with radio receiving apparatus on board a moving train. The tests are being made on the trains running between Toronto and Ottawa with the co-operation of broadcasting stations at both cities. The first step desired is to supply passengers with concerts, late news, market reports and sporting results. When this point has been satisfactorily reached it will naturally lead on to what now appears more difficult to obtain on a commercial scale, that is the sending and receiving of business messages to and from a moving train.

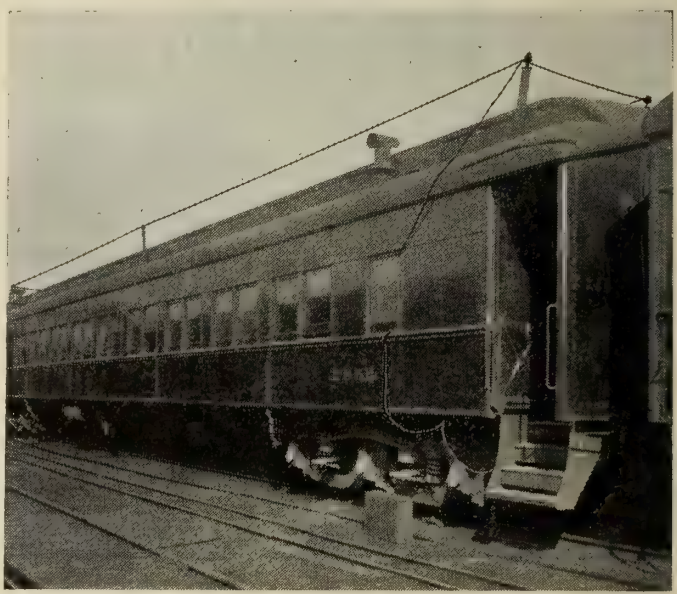
Difficulties of Reception

When first considering the project of putting receiving apparatus on a train it was found that the difficulties are greater than appears on the surface. It is necessary to put the antenna, which ordinarily should stand in the air, a considerable distance from any object, especially a conductor, within fifteen or eighteen inches from the steel of the car as it cannot be raised higher on account of the overhead obstructions, such as bridges etc. No matter how tightly the wire of the aerial is drawn it will sway and move with respect to the ground as the train travels at any rate of speed. This causes a constant change in capacity between the antenna and the ground. The lead-in wire cannot be removed more than one or two inches from some parts of the steel of the car and the car is naturally all grounded, thus bringing the antenna in close proximity to the ground. The ground wire is soldered firmly to the trucks of the coach, which makes a fairly good ground while the train is standing still but as soon as the train is started an oil film forms between the journal and the axle of the car, causing a high resistance between the trucks and the ground. When operating an ordinary stationary receiving set great care is taken not to jar the set or have any part of it moved, for mechanical motion in the set causes very audible noises in the receivers or loud speaker. It will be easily seen what will happen on a moving train when the instruments are continually in mechanical vibration. Then there are the deafening train noises to overcome as the output must be loud enough to be heard above all other competing noises. This will give some idea of the difficulties to be confronted when attempting to make radio receiving a success on moving trains.

First Tests on a Wooden Car

Tests were first carried on in one of the company's few wooden cars still in service, with considerable success. These cars offer much better opportunity for proper insulating of the antenna and lead in wire, and naturally better results were obtained than could be obtained in a steel car. Realizing, however, that it would eventually be necessary to overcome the difficulties which a steel car offers, if the apparatus were to be of any use whatever, the experiments were started in a steel car.

On Wednesday, July 26, 1922 a temporary antenna was constructed inside a coach, in order to experiment with an inside antenna. Arrangements were made with broadcasting station C.F.C.A. for special broadcastings during the test. The train was scheduled to leave Toronto for Ottawa at 12.07 p.m. At 11.50 a.m. the apparatus, consisting of two stages of radio frequency amplification and a power amplifier connected to the loud speaker, was connected to the inside antenna. Station C.F.C.A. broadcasting market reports was picked up and could be heard throughout the car and on the station platform outside of the car while the train was standing. The first test broadcasted started about 12.05. It was heard quite clearly while standing but became fainter when the train started moving. The sound then seemed to come in waves of loud and soft tones which was due probably to the swinging of the inside antenna as the train moved. The first test ended at 12.20. Toward the end of the experiment the sound became fainter and more indistinct as the distance between the train and the broadcasting station increased. The second test which was scheduled for 1.00 p.m. could not be picked up. After trying again to pick up market reports which were broadcasted at 1.30 and being unable to locate them the broadcasting station was wired to cancel further tests until the return trip. This experiment apparently showed that an inside aerial was not successful.



Installation of Aerial on Car

Signals Received at 110 Miles

At Yarker, a point about half way between Toronto and

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*Canadian National Telegraphs.

Ottawa, the party transfered to a train returning to Toronto. A different set and a different antenna were used on the return journey. The antenna was of temporary construction, consisting of one wire along each side of the car, about 18 inches above the roof. The set contained one stage of radio frequency amplification, two stages audio frequency amplification and a power amplifier connected to the loud speaker.

Near Trenton, 110 miles from Toronto, the first indication of a carrier wave was received, which shortly after tuned in to a concert being broadcasted by station C.F.C.A. at Toronto. This was at first only audible in the head phones. At Cobourg, 70 miles from C.F.C.A., the loud speaker was connected and the concert could be heard in the vicinity of the set. The volume gradually grew louder as the distance decreased. When the train reached Oshawa, 34 miles from the broadcasting station, the reception could be heard loudly and distinctly for four or five seats around the instrument. As the train drew nearer Toronto the radius at which the broadcasting could be heard increased. Durthis trip touch was kept with the sending station by telegraph at the stations along the way and answers were received by radio. The passenbers in the rest of the train crowded into the test car and showed keen interest. Besides announcements and music, several spark stations were picked up, and code messages received very distinctly.

An automobile adaptation—set inside when in use

On various other tests interesting results were recorded. When leaving Ottawa a small broadcasting station was heard quite plainly for a distance of 30 or 40 miles, broadcasting music from a phonograph. A concert broadcasted at Buffalo was heard clearly as the train steamed into Toronto.

Reception Affected by Character of Country

Conditions in a rapidly moving train change so rapidly that perfect tuning is difficult. It is noticed that when travelling through a heavily wooded country the signals become very faint, and come in strong again when cleared land is reached. When near a body of water, the signal strength increases considerably, but when going over a high bridge, it dies down. They are not affected to any extent by going through a cut with high walls of rock or clay on either side of the train. Sometimes as the train goes around a curve the signal strength becomes fainter and sometimes it increases. This may be due to the position of the antenna relative to the broadcasting station.

There is one other thing which effects the proper reception of radio on trains and that is the proximity to power lines, which run along railway lines or across them. When near a power line, interfering sounds are heard distinctly in the loud speaker, sometimes so as to drown out the radio signals. Telephone or telegraph lines have little or no effect.

Experiments have been carried far enough to show that there are great possibilities in radio railroad work both in receiving and broadcasting, first as a source of entertainment for passengers by means of concerts, then for commercial purposes in sending and receiving communications and for train despatching. A specially constructed railway set will be necessary to overcome the peculiarities of train operation before dependability is reached. The secret of success may be in frequency amplification, upon which much experimental work is now in progress. When a point of reasonable perfection has been reached it will be added as a part of National Service on important trains.

The Most Powerful Radio in Europe

A new era in communication between Europe and America began on Aug. 9, 1922, according to radio engineers, when the big wireless station of the Centre Radio-electrique de Paris at Sainte Assise, France, opened officially. This plant, said to be the most powerful radio in Europe, puts America and Paris in direct touch with each other for the first time in the history of the world. Pressing a key at the French company's central control station at 79 Boulevard Haussmann, Paris, an operator flung dot and dash message 3,000 miles and more through the air to the central control of the Radio Corporation of America, as easily and quickly as one might telephone from Ottawa to Montreal. And the answer was shot back almost instantaneously.

Apparatus in Use

The transmitting station of the French plant is situated on the plains of Sainte Assise, forty kilometres southeast of Paris. The apparatus consists of two high frequency alternators of 500 kilowatts in the antenna, each driven by two direct current motors of 450 kilowatts. These groups can function together or separately, either affecting a single transmission with a power varying from 250 to 1,000 kilowatts in the antenna or affecting two simultaneous transmissions with power permitting each between 250 and 500 kilowatts in the antenna. The receiving station has been erected at Villacresnes, halfway between Paris and Sainte Assise. It consists of six receiving units supplied with the most up-to-date apparatus. Normally the messages are received directly at the Central Bureau, Paris, by means of special high-speed machinery.

Government Gives Aid

The French Government began nearly two years ago aiding in the organization of a company that would take over wireless, and on January 9, 1921, M. Deschamps, Minister of Posts, Telegraphs and Telephones, laid the first stone of the great plant that was to be at Sainte Assise. A description of its plant as drawn up by the Centre Radio-electrique Company states that its transoceanic service is to be carried on by a station capable of radiating an antenna current varying from 250 to 1,000 kilowatts, according to the range or the difficulties which the communication in question presents. There and a central office supervising the various stations and for the convenience of the public.

Handling Radio Trouble Tests

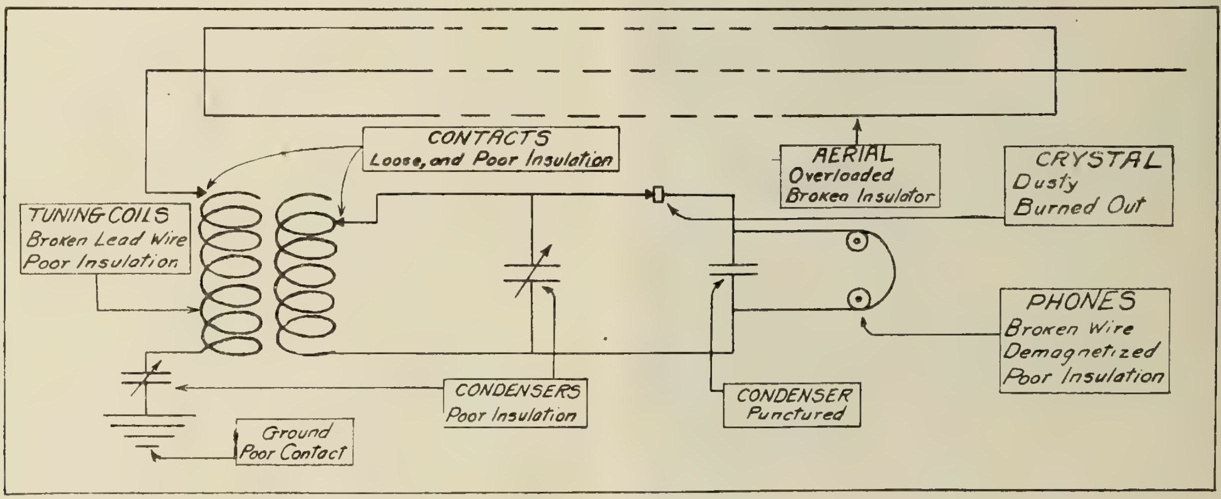
Servicing of Radio Equipment is a New Job that the Dealer Must be prepared to handle

It is an easy matter to sell a customer **once**; the hard part of a salesman's job is to sell him **well**, that is, to make him a repeater. It costs less to resell to old customers than to acquire new ones and, therefore, square dealing and service create the good-will which is the highest asset of business. This applies to radio merchandising, as much or more than anything else, and the natural corollary is that the salesman must know something about the functioning and maintenance of the apparatus he sells. The explanations that are given in this article are, accordingly, written for the salesman's point of view, with the object of enabling him to give service, and unnecessary theory has been eliminated.

Defective Sets Not Uncommon

Defective sets are not uncommonly, received in that condition from the manufacturers. Time will change that state of affairs, but the radio market is at present in such a condition that no dealer should feel justified in giving a set to a customer without at least a rough test in his shop.

In this case let us assume that the customer has bought a simple crystal set which will not function properly. The best thing to do is to go to his house and test it. A visual examination should first be made and will reveal any defects such as loose connections or defective parts. This may be set down as the first rule of procedure.



(1) Check up on the hook-up by going over it carefully. Tapping connections should reveal any broken circuit.

(2) If No. 1. shows everything in good condition, make an actual test. Hook up apparatus and tune on various wave lengths.

(3) Crystal scratches, static or very faint signals, indicate that the phones are not likely to be the cause of the trouble.

(4) If no sounds are heard in the phones, replace them with another pair. Signals then being heard, indicate that the trouble lies there.

(5) If phones are O.K. substitute another receiving set complete. No reception in this case indicates the aerial is at fault. If it happens that no other receiver is convenient, go over aerial, looking for broken insulators, bad insulation, poor ground, etc.

(6) Let us assume that so far no signals have been heard, but connections, phones and aerial appear to be in good condition. The trouble is then internal and is liable to be in the crystal. Remove it and test with another one.

(7) No results from a new crystal indicate that the coil or condenser may be defective. Test the coil by putting a single dry cell in series and taking a reading with a low reading voltmeter. If the dry cell voltage is very much cut down it indicates a break at some point. Take readings at various taps. These should be nearly equal.

(8) Test switch or slider contact by voltmeter cell test.

(9) Condensers are often very flimsy, but they should withstand a dry cell potential; try the condenser out by putting the cell in series and testing with the voltmeter.

(10) The condenser mounting may be improperly insulated. Clip one end of the dry cell circuit to the connection and touch the other end at various points.

(11) If the trouble has not been located so far, the whole circuit must be tested from point to point.

(12) Interference may be caused by a nearby power line or generator, etc.

General Pointers

The use of a low reading voltmeter is indicated in several of the above tests. In its place, a small flash lamp can be used as a circuit tester, the lamp and cells being removed from the case, and the brightness of the filament indicating relative resistance effects.

The tool kit of the radio service man should include the dry cell and voltmeter or flash lamp, a tested crystal and buzzer for testing, soldering kit, and file, screw drivers, pliers, etc.

It may happen that connections and construction of the set will be perfect and yet the reception is very poor. In such a case it is likely that the aerial values are wrong. Note at which end of the inductance contacts reception is most satisfactory. If the signals are best at minimum of inductance, the aerial is fixed at too long a wave length.

The currents flowing in a simple set are as small as .001 milliamperes and less, and small resistances have serious effects. Contacts **must** be good.

The dealer, however, who continually hears complaints about poor selectivity, poor tuning or interference should make up his mind whether the design of the apparatus is as good as it should be. Inferior design and construction makes poor results inevitable and the only remedy is to junk such apparatus.

How to Instal a Recieving Aerial

Antennae and Wave Length—Data for the Use of Dealers and Salesmen—Wave-meter and Calibration

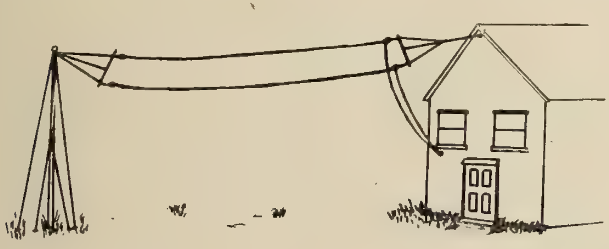
After the customer has been sold a set, it is by no means certain that he will install it properly. A few tips from the dealer will enable him to get it going with the minimum of trouble, and win for the dealer a great amount of goodwill. It is not difficult to erect a suitable aerial but mistakes can be made; the following instructions will help the salesman or dealer to advise his customers on the subject.

For receiving purposes, the antenna need be only of the very simplest kind. The higher it is erected, within reason, the better the result obtained. A single wire 100 feet long and 40 feet high is often very satisfactory.

An insulator should be placed at each end of the wire. The lead-in should be soldered on and carefully insulated from all objects that would conduct current, such as the leaves and limbs of trees. One method of installing the receiving antenna is illustrated in Fig. 1.

Fixing Antenna to Trees

The tree method seems to be a favorite one in country and suburban districts but causes considerable trouble from broken wires due to the swaying of the trees in the wind.



Where it is possible to anchor the outer end of the antenna to some fixed object like a house, barn, or pole, there will be much less breakage of antenna but where it is necessary or more desirable from the point of view of position or height to use a tree, it is well to advise customers to allow plenty of slack in the wire to allow for sway. Trees with small trunks sometimes have a sway in the upper part of 10 or 15 feet while even trees with trunks a couple of feet in diameter have a sway of 5 to 10 feet in the upper part.

Another caution that will assist in advising correct installation is to have the insulated section clear of the leaves of the tree. Allowance of several feet should be made on account of the branches blowing and for growth of the tree during the course of the summer.

When installing an aerial, point the antenna in the direction that it is desired to receive from, for the most efficient results. The end of the antenna at which the lead-in is brought in is the pointer end and should be directed at the transmitting station it is desired to listen to most regularly.

Aside from its directional qualities no definite rules have yet been determined governing the position in which an aerial must be placed. It may be straight up and down or horizontal. The only essential thing is that it shall be well insulated.

Wave Length

A knowledge of wave length is important with transmitting sets, and indeed, it is necessary to properly comply with the Government regulations. At the same time, the man who possesses only a receiving set, is interested in knowing what wave length he is receiving. These results are obtainable only with a wavemetre though there is a rough method of estimating the wave-length of an aerial, as follows:—

Add the length of the lead-in to the aerial wire length. If more than one wire is in the aerial, add one-third of length again. To this add the length of the ground wire. Take one and one half times the total.

Example: Find wave length of an aerial of three wires, 65 feet long, with lead-in 12 feet and ground 20 feet, $65+22+12+20=119$. One and one half times 119 equals 178, which is the approximate wave length of this antenna system.

The customer will feel exceedingly grateful if he wants to know something about a wavemetre and the dealer can give him the right instruction. A wavemetre may be used for a variety of purposes even with only a receiving set. It may be used to measure the wave length of an in-coming signal or to determine the distributed capacity or the ratio of coupling between primary and secondary circuits. A fairly reliable wavemetre may be constructed comparatively cheaply, though more elaborate apparatus is necessary for the determination of the wave lengths of high powered stations.

Construction of a Wavemetre

The amateur will be able to make a wavemetre which will give pretty reliable results in tuning up his sending set. Of course, for the measurements of high powered station wave lengths more complicated outfits are required. A variable condenser of 43 plates should be secured. If a case is obtained for it, and a cover with scale in degrees used, it will be much better. Also,, if it is "contained" it will not only be much less liable to injury, but may be filled with pure castor oil which will increase the capacity some forty per cent. If a coil of certain inductance is shunted around this condenser and around the other side, a pair of phones in series with a galena detector, a complete wavemetre is ready. It must be calibrated from a standard one or else a curve of calibration obtained from the makers of the known inductance. For the inductance coil, a small wooden or bakelite disc 3 in. wide and ½ in. thick may be used. Cut a slot 1/16 in. wide and 1/8 in. deep around the edge. Wind about 20 turns of No. 28 double cotton-covered wire around and bring out to two binding posts. The detector may be mounted on a brass rod. In the centre the condenser binding posts are fastened. The coil is at one end and the detector and phone binding posts at the other end. Thus all connections are stationary and permanent. The capacity of the condenser should run from .0001 to .0005 mf. and be of stable construction.

How to Calibrate

If the amateur can get the loan of a standard wavemetre. he may calibrate his own quite readily by using a buzzer. The buzzer excites an oscillation current, and by means of inductive coupling the other condenser may be calibrated and marked on the scale for corresponding wave lengths.

There are more than 200 broadcasting radio stations in Canada, and the United States.

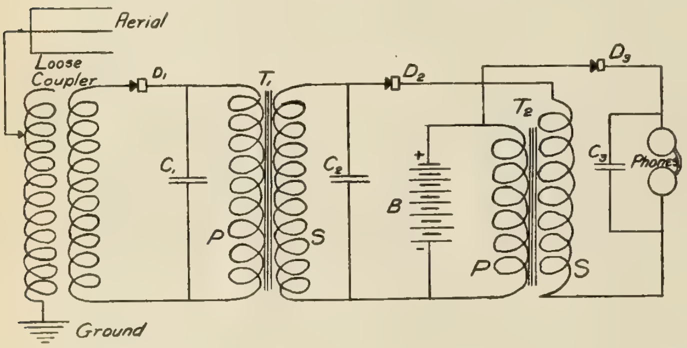
Signals May be Amplified with Crystal Outfit

Improvements and novelties are abundant in the radio field, and it requires a wideawake dealer to keep abreast of them. For instance, not long ago, most of us declared with some confidence that it was impossible to obtain amplification with a crystal hook-up—and now an amateur has announced his discovery of a method of doing that very thing.

His hook-up for the purpose comprises three galena detectors, a tuning device such as a loose coupler, two audio frequency amplifying transformers, three fixed condensers, a high voltage or B battery and telephone receivers. A schematic diagram in given in Fig. 1. The battery was necessary to furnish currents to help the weak incoming radio signals push their way through the amplifying transformers and detectors. It is said that any form of tuning inductance may be used, but better results will be obtained with a loose coupler, as it will permit closer tuning, an important factor.

The most sensitive crystals are employed, galena being preferable. However, if a very sensitive srystal is used in the first detector, it will be found that the amplifying detectors will not require ones so sensitive. Crystals are tested in the usual way, by a buzzer.

In adjusting the detectors, the cat whiskers of the amplifying detectors should rest on their respective crystals. Then the first detector (D1 in diagram) is adjusted by means of the buzzer method. The adjustment of this detector is very important and should be made carefully. The second detector must not be carried to the primary of the second transformer, but must go to the secondary. If this is not done, it will be found that the signals will not carry through the second transformer.



In the diagram, D1, D2, and D3 are galena detectors. C1, C2, and C3 represent fixed condensers of 0.001 microfarad capacity. T1, and T2 are both ordinary audio frequency ampifying transformers of the type found in tube sets. Their primaries are indicated by P and secondaries by S. B is a 22½-volt battery, connected as shown. This may be increased with somewhat better results. The best voltage must be determined by experiment.

The inventor has not yet determined whether it is possible to use a loud speaker, though he claims, that the usual range of the outfit is considerably increased.

Battleship Steered by Wireless

The obsolute battleship Agamemnon was recently used in the English Channel as a target for bomb practice from the air. Without a living soul aboard, she was controlled and steered by wireless from a destroyer which was miles away. Steaming at ten miles an hour and changing her course from time to time in answer to the wireless direction, the Agamemnon was handled by wireless alone through a series of manoeuvres.

Commercial Radio Left to Companies

It is said that the policy of the Canadian Government is to get out of the commercial end of wireless telegraphy, to which it was to some extent committed as a war exigency. It will, of course, maintain such wireless installations as are an aid to navigation.

One of the largest wireless stations in Canada, that at Barrington Passage, N. S., will be closed in the near future. This follows on similar action taken by the British Government with regard to the Admiralty medium power radio station at Bermuda, which was closed on July 1. As a consequence, the commercial service between Barrington and Bermuda has been suspended, and, as the Government has no other use for Barrington, it will be closed. Both were war stations, having been erected in 1915 as part of the chain of naval radio stations extending from St. John's, Nfld., to Demerara, British Guiana, Barrington acting as the connecting link between St. John's and Bermuda.

The closing of Bermuda and Barrington marks the termination of the North Atlantic chain of naval radio stations, St. John's, Jamaica and Demerara having been closed by the Admiralty in June. The three radio direction finding stations at Cape Race, Canso and Halifax, erected during the war, will be retained as a permanent part of the "aid to navigation" service of the Department of Marine and Fisheries.

The Power of Service

He drove into a small gasoline filling station where automobile accessories are sold. The fellow in the car on the other side of the gas pump was one of those even-tempered individuals—mad all the time. "What do you ask for these new-fangled lenses the law says we must use?" he grunted.

"Four dollars," answered the gas man. "You need a little more air in that left rear tire. Don't get out, I'll attend to it."

"Your price is too high. I can get them for three and a quarter."

"Zat so? I see you don't need any oil." He lowered the hood as he spoke and carefully wiped off a grease spot.

"You fellows are robbers. I'll give you three and a quarter and not another cent."

"You need at least a half-gallon more water," remarked the gas man as he reached for the can. "You're going to spoil a mighty good car some day if you aren't more careful."

"Will you put 'em in for three and a half?"

"Can't do it. By the way has the rim squeaked any more since I tightened up those lugs "

"Dammit. Put 'em in. You render me so much service I can't afford not to deal with you."

Doesn't the moral of this little incident shine out like a house afire on a dark night?—The Buzz Saw.

The question of most vital interest, however, is whether or not the period of greatest stress is behind us. A decreasing total of failures in the United States during the successive months of the present year would seem to indicate a definite improvement in conditions. Canadian figures disclose a similar situation, in spite of the extremely high business mortality rate during the first half of the year. The record of solvency during the second quarter is an improvement over that of the first quarter.—Royal Bank of Canada.

Radio Window Display Must First Attract Attention

The Prospect Comes in and Buys After the Window has Caught His Notice—Suggested Displays

One of the most important helps to selling radio equipment is the intelligent use of the show window, says a writer in the National Electragist. In displaying radio, there must be a middle ground and some old established rules must be either broken or modified to suit new conditions. There are radio buyers in both the wealthy and the poorer classes. The appeal must be made to reach both classes . It would be a poor policy to display a single piece of the more expensive equipment in a window all by itself surrounded only by an artistic background and velvet draperies.

On the other hand the display of hundreds or thousands of small binding posts, condensers, coils or wire, insulators and other miscellaneous equipment hardly fills the bill There seems to be much that can be done in the matter of displaying radio goods. Here are some suggested layouts for windows:

A Variegated Display

Section 1—At the centre of the window show two or or three radio telephone receiving sets of different sizes and types starting with a simple crystal set, an audion detector set, a regenerative set and a two or three stage amplifier set. As there are new recruits being constantly added to the army of radio fans, it is necessary to go further than merely displaying these sets. Each set should have a neat placard under it stating its use, its approximate range in miles and wave lengths and its price.

Section 2—Right of the window. This does not need to be separated from the central section but may be as desired. Several types of antenna equipment could be shown with the coil of wire, insulators, lightning arrester, tube, lead in wire and everything necessary. It would be well to label each article and have each group placarded neatly with the price and any information available about the style of set it is supposed to go with. Headpieces could also be displayed with this section, each labeled with trade name, the resistance in ohms and the price. Some of the more elaborate antenna equipment such as coil antennae, loading coils, etc., could also be shown to advantage.

Section 3—At the left of the window two or three groups of equipment for "making your own" could be shown. These groups could be placarded: "This is the equipment you need to make a crystal receiving set, $19.75"—or something like that. And so on with two or three other sets showing the actual wire, binding posts, condensers, tubes or whatever is necessary to the amateur to complete the making of the set.

This seems to be almost the primary kind of a display and there is no limit to the elaborations that can be made If sufficient windows are available there is no reason why each of these sections cannot be expanded into a window by itself. It would seem to be much more logical to display goods this way than to throw a lot of stock into the window and let it go at that, and yet this is too often done.

Using Ribbons

The back of the window is covered with white paper on which is drawn a conventional house with a radio receiving set. An artist could sketch this up attractively and so arrange it that the antenna receiving set, ground, headpieces, etc., are all shown. Those parts which do not show on the outside of the house can be shown through a window or the house can be shown with the walls broken away to show the desired parts. Very small ribbons of different colors are pinned to the different parts and the other ends of the ribbons brought down to the floor of the window to the actual parts. For instance a red ribbon would be tacked to the sketch of the antenna wire and the other end of the ribbon would lead to a coil of real antenna wire. A blue ribbon would be tacked to the receiving set and the other end of the ribbon would lead to the real set in the window. And so on with all parts such as lightning arrester, ground clamp, porcelain tube for lead in, lead in wire, ground wire, etc. A window such as this can be made very attractive, and if the window is a large one the sketch can form a permanent part of the display, auxiliary displays being changed from time to time. It is also possible to vary the scheme by having a sketch or a large blueprint of a receiver and ribbons—from the drawing leading to parts necessary to make the set.

For More Expensive Sets

Where the prospective customers are able to afford the more expensive things in radio, an attractive window can be worked up by showing several of the more elaborate sets, sets contained in consoles, in table lamps, elaborate loud speakers, and so on. For a class of customers like this, much of the cheaper goods can be elimiated from the window although even the wealthy have sons who like to fuss around making things for themselves. If the store happens to be in a wealthy neighborhood, remember that there are many of the younger generation who are on allowances that make it necessary to look out for the pennies.

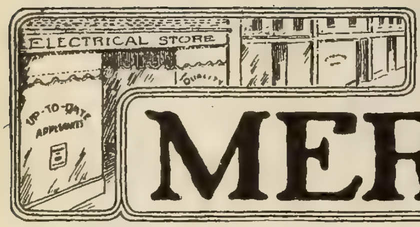
Clifden Wireless Station Damaged

Louisburg wireless station has recently been working direct with London instead of its accustomed trans-Atlantic corresponding station, Clifden, Ireland. The messages from Clifden suddenly ceased, and shortly afterwards came instructions to work with London. This caused no inconvenience to Cape Breton, which is so powerfully equipped that a few hundred miles more or less means nothing, but the London station is not a trans-Atlantic station and its power plant was exerted to the utmost to carry on the additional service.

Reports received by the Marconi company from Galway indicate that the damage done to the Clifden radio station on the coast of Galway, which was set on fire by the Irish irregulars, was not as serious as at first supposed. The Marconi officials say they hope to re-establish direct communication with Glace Bay within twenty-four hours. Meantime messages for Canada are being sent from the new sattion at Ongar, in Essex.

The main building, most of the machinery and the condenser house at the Clifden station are virtually intact, but many of the overhead and underground wires which fed the station were destroyed.

"There may be a time when power to turn the wheels of industry will be furnished by radio. In some respects, radio power transmission exists to-day, for the message you receive by radio has been carried by the power of electromagnetic waves from the sending to the receiving station. Successful work is now done in directing radio waves, as for instance, our trans-Atlantic stations send out most of their power eastward."—Dr. Charles Steinmetz, at International Radio Congress.



BETTER MERCHANDISING

It's an Ill Wind that Blows Nobody Good

The coal shortage, due to the strike of the U.S. miners, has created a very serious situation for the general public.

The only alternative source of heat, in many localities, is electricity. Of this there is not enough to go round, of course, but, as an auxiliary, it can go a long way toward relieving the situation.

In many sections of the Dominion there is a surplus: for instance, in that section of Ontario served by Niagara Falls. Queenston has three fifty-five thousand horse-power units already installed; the early fall will see a fourth and the New Year a fifth generator in action—a total of 275,000 horse-power. For the sake of argument let us suppose that half of this could be spared for heating purposes to supplement our limited coal supply,—i.e., 137,500 horse-power or 103,000 kilowatts. Allowing for the diversity factor it would doubtless be quite safe to connect a heating load of 150,000 kilowatts.

This looks like a fine opportunity for the manufacturers and dealers. The average heater has a capacity of perhaps 1,000 watts; most of them are less; comparatively few are greater than 1,500 watts. Therefore there is "juice" to operate 150,000 heaters. And this applies to the Niagara district alone.

Here, then, is a job for the Electrical Industry during the next two months. Wherever the pinch of the coal shortage is felt, if there is a surplus of electric energy, don't delay a moment.

Isn't it a great opportunity?—**Start today.**

Convention of Contractors and Dealers, November 13 and 14

The convention of electrical contractors and dealers which is being arranged for Toronto, on November 13th and 14th., under the "auspices" of the Ontario Contractors and Dealers' Association is already giving promise of bumper results. Mr. Charlie Hopper, chairman of the General Convention Committee is a thorough enthusiast himself and also has the faculty of gaining the hearty co-operation of his co-workers. The various committees are already hard at work.

While this convention, having its meeting place in Toronto, will naturally draw its largest clientele from the province of Ontario, it is the hope of the committee that delegates will be in attendance from every city and town of prominence in Canada, so that it will, in affect, take on the nature and authority of a Dominion convention. Most of the discussions likely to arise will be of such a nature that the experience and advice of contractors and dealers from all over the Dominion will be eagerly sought and exceedingly valuable in reaching decisions.

The Committee hopes that every city and town in Canada will take immediate steps to have representation at this convention. If you cannot come 'En Masse' send one or more delegates—but no town, however small, should fail to have one representative.

Lay your plans early and remember the dates—Nov. 13th. and 14th.

Telephones Silent in Honor of Dr. A. G. Bell

For a period of one minute on Aug. 4, there was no ringing from any of the telephones in homes or places of business over the two provinces of Ontario and Quebec; nor was there any response to lifted receivers. This stoppage was a reminder of the monumental work effected in the life of Dr. Alexander Graham Bell. Even the brevity of the pause emphasized the integral and essential part Dr. Bell's invention continues to play in the life of the world.

In Brantford, Ont., the Bell memorial was decorated with wreaths in memory of one of the city's greatest men.

Dr. Bell was born in Edinburgh, Scotland, on March 3, 1847. He was educated at Edinburgh and London, and held honorary degrees from several British, Continental, and American universities.

He invented the telephone, for which the first patent was granted on March 17, 1876. He also invented the photophone, the induction balance and the telephone probe for painless detection of bullets in the human body.

In recognition of his inventions he was awarded many decorations, and among other honors was created an officer of the French Legion of Honor.

100 Per Cent.

As a result of the visit of Mr. K. A. McIntyre and L. W. Davis to the cities of Port Arthur and Fort William the following contractors and dealers have been elected to memberships in the Ontario Association of Electrical Contractors and Dealers;—

A. C. Waltz & Company,	Port Arthur,
Mahon Electric Co. Limited	Fort William,
Fort William Electric Co.,	Fort William,
Electric Sales & Engineering Company	Fort William,
Howard E. Phipps,	Fort William,
Lakehead Engineering Co.,	Port Arthur,

We understand that this represents a 100 per cent. membership.

The Diamond State Fibre Company of Canada, Ltd., expect to have an interesting display of Condensite Celoron, in addition to their usual show of Diamond Fibre, at the Canadian National Exhibition. This display will be housed in Booth 89-A in the Industrial Building.

To Remove Oil or Grease Spots from Carpets

It is probable your customers frequently ask you for a practical and efficient method of removing oil and grease spots from floor coverings or perhaps the rugs or carpets in one of your departments are oil spotted. There are undoubtedly several methods used, all indifferently effective, but here is one that is simple, easy and is claimed to be efficient and will in no way fade nor injure the rugs. It has been developed and tested in the research laboratories of the Hoover Suction Sweeper Co. at North Canton, Ohio. These laboratories are devoted exclusively to the investigation of better cleaning methods and they have thoroughly proven the worth of this means of grease-spot removal:

Rub talcum powder or French chalk into the spot thoroughly. Then remove this powder with the Hoover electric cleaner. Repeating this operation several times will completely remove the spot. In the event that this should fail to take out the spot, it is due to the fact that the grease is too hard. This can be remedied by ironing with a hot iron after first, of course, dusting with the powder. This will melt the grease and allow it to be absorbed by the powder. Then all can be taken up with the cleaner.

I. E. S. Annual Convention

The Illuminating Engineering Society will hold its 16th Annual convention in Swampscott, Mass., on September 25th to 28th. The following topics will be discussed: Residence Lighting Practice in the United States; Wiring and Lighting in the Middle Class Home; How to Tell Period Styles in Fixtures; Overcoming Daylight Reflections in Show Windows; Effect of Light on the Drawing Power of the Show Window; Illumination of Cafes and Restaurants; Lighting the Food Industries; Performance of the Tungsten Filament Lamps on Alternating and Direct Current; Practical Application of the Principles of School Lighting; Office Lighting from the Viewpoint of Hygiene; The Cost of Daylight; Motion Picture Studio Lighting; Screen Brightnesses for Motion Pictures, etc.

Messrs. Cochrane, Stephenson & Co. Ltd., have been appointed Western Represenataives for the Square D Company.

Mrs. Byer Is Disgusted with Unbusiness-like Contracting Methods

An Open Letter That Exposes the Errors Some Contractors Fall Into

Editor, Electrical News,

You may think that I have mistaken your periodical for a Ladies Home Journal, but I assure that is not so.

I believe that now we women have won the right to vote and to be voted upon, to be M.L.A's and M.P's, and to do our cleaning, washing, ironing and cooking by electricity, we should be entitled to have our letters printed in the "Electrical News," and I am sure, Mr. Editor, if it will not pass on its own merits your chivalry will prompt you to print it.

By way of introduction, and partly to explain to you my reason for writing a letter to an electrical trade paper, I will say that although my name is Ida A. M. Byer, my husband calls me instead I-do, and I am the buyer of various electrical appliances for our home, which now and again brings me in contact with your electrical contractor-dealers, as they call themselves but, most important of all the reasons is the fact that my best chum, my sister, is married to an electrical contractor-dealer.

Not wishing to cause any trouble in my sister's household, I'll just say that we live in Canada and that my brother-in-law's name is Ben Socket; my husband is a plumber who started in business on his own at practically the same time as Ben Socket did.

My sister being my best chum, I am naturally aware of all their pleasures—which are mighty few—and troubles personally and in business—which are many. My husband Jim and I frequently used to wonder why it was that although Jim worked a great deal less hard and shorter hours than Ben did we were considerably better off, had less financial business worry and enjoyed the leisure hours running about in our own motor car whereas the Sockets are still patronizing street cars, when they do not walk.

Then I began listening to the conversations between Ben and my husband, and have come to the conclusion that Ben's troubles are not only his own but probably also those of most men engaged in the same business as he is.

Ben knows where the shoe pinches

What I, as a women, dislike most in Ben's attitude is that he knows where the shoe pinches, knows what is wrong and how it could be at least partly rectified (and I am sure others like him know also) but all he does is to complain, find good excuses and reasons for conditions not being as they should be, doing nothing to improve his lot—although most of the means for improving these conditions are in his own hands.

For the last year and a half Ben has hardly made a living out of his business, and my poor sister has an awful time trying to make both ends meet, although they are living as modestly as one may. You may readily understand, Mr. Editor, how disheartening this is for me, seeing my sister and Ben working hard, striving to accomplish something worth while for nearly twelve years and instead of progressing finding themselves worse off as time goes on.

My husband, when listening to Ben's complaints of business conditions in the electrical trade, often loses patience and tells him that he has a wrong name, that he should change it (and all other electrical contractor-dealers should change theirs) to what he believes my brother-in-law should be called instead of Socket; then, perhaps out of shame, they would take the bull by the horns to make the electrical contractor-dealers' business at least as profitable and respectable as the plumbers' is today.

Jim tells me that in the building of an average home the plumber gets 8.7% of it's value, and that the electrician and the hod carrier each get about 2.6%; in the construction of a brick house, the hod carrier gets 6.7% against the electrician's 2.6%.

But, you may ask, why is Mrs. Byer writing all this to me? Why does she want me to print it in the Electrical News?

I pray of you, Mr. Editor, to print it in hopes that electrical contractor-dealers, or their wives, if the men will not, will write to you also telling what is wrong and how to find a remedy, for surely there is a remedy for everything. I feel I must do something to help my sister and this can be done only by making Ben Socket a two-way useful electrician: a good tradesman and a good business man.

"I began listening to their conversations"

Now I shall give you an outline of some of the conversations that frequently go on between my husband and my brother-in-law, which will bring out some of the sore points in his trade:

The other day Ben told my husband of another electrical contractor-dealer, named Plug, who had done some work for Charlie So-Long, a Chinese laundryman, in whose place of business for a considerable time there was one light outlet in the center of the ceiling from which a number of flexible cords provided six or seven lights around the place. Charlie, of course, was hardly to be blamed for it, as the work was done by an "electrician" and as nobody saw to it that Charlie provides a proper and safe lighting installation in his laundry, he was squirting water on shirts and collars year after year by the light of some 700 watts fed from one circuit via flexible cords running all around the walls. Recently a relative of the Fire Brigade Chief brought some silk shirts to Charlie

So-Long to be washed and, as he realized that his shirts are safe with So-Long only so long as there is no short circuit in the wonderful electrical installation in Charlie's establishment, he used the influence of his relative to put some fear into Mr. Chinaman's heart to have a safe lighting installation, which the uniform of the obliging fire Chief succeeded in accomplishing.

The opportunity to get this work was given to Plug by Wringer, an electrical appliance dealer, who, some time previously, had sold to Charlie a washing machine. Wringer, who sold Chinamen a considerable number of washing and ironing machines, always at a reasonable profit, of course, because he was a real dealer and knew how to handle business and customers, warned Plug, on the strength of his past experience, to charge Charlie a reasonable price, and stay with whatever price he may ask.

"No Payee, No Washee"

So-Long, like all other "Charlies," got prices from several electrical contractors, although all "Charlies" charge identically the same price for washing the laundry and it is just a waste of time to argue lower price with them, their maxim being:—no payee, no washee. When Plug went to Charlie to tell him he would start the job the next morning, Charlie asked very phlegmatically: "Hamush?" "Twenty four dollars, Charlie, for six light outlets anl I'll give you a first class job for that money," was Plug's answer.

So-Long grinned slyly and without any haste pulled out of his pocket a few business cards of electrical contractors and, showing one to Plug, said with a grin: "he makee fils class job sixteen dollal." Plug did not even take time to figure out if, taking the job for that price, he will cover the cost of material, labor and overhead, but just said, "all right Charlie, by golly, I'll do it for the same money."

He did not reflect for a minute how much better off he would be refusing altogether Charlie's offer, instead of accepting work at a figure that did not allow him any profit—for the sake of which he was in business and to which he was justly entitled—but was actually giving to Charlie out of his pocket part of his overhead expense, as he has since discovered when going over the figures of the job at Charlie's price. All Plug saw at the moment was a bunch of his fellow contractors trying to beat him out of a small job calculated on a basis of reasonable prices and profit. He forgot Wringer's advice and his previous plans of giving Charlie such a fine job at such a reasonable price that he will be able to get perhaps thirty or forty other Chinese laundries provided with proper lighting system, which Wringer had said could be done if he only handled the sales of his trade in proper manner.

My husband interrupted Ben with an angry, "the darn fool. You fellows certainly should be prohibited from being in business. You should be working in abattoirs, cutting throats, that's your specialty; why, your friend Plug would have been better off if he had stayed home rocking in a chair, instead of letting the Chink beat him down on his price; he killed all the Chinese work in this city for all you electrical contractors, setting that low price as a standard."

I saw on Ben's face that he was quite sick of it himself, and also that this system was one of the reasons why he was not succeeding in business.

Plug Does a Little Plumbing

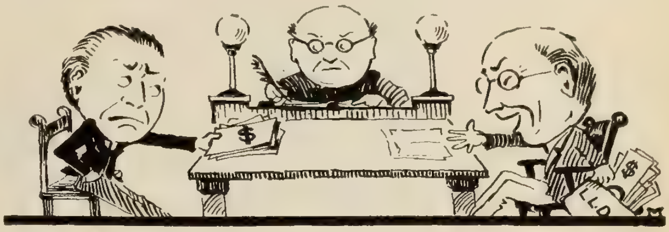
"This is not the whole story yet," said Ben, somewhat ashamedly. "When Plug finished his job, Charlie asked him if he would shift his sink, which Plug agreed to do, hoping to make up at least a part of his lost overhead and profit on the work of his own trade.

"Charlie's neighbor is a grocer, whose brother is a plumber, and he happened to be in the laundry when Plug was moving the sink, for which he charged Charlie $3.75.

"The grocer informed his plumber brother that Plug is beating him out of a job, and poor Plug was summoned before a Recorder: 'for doing plumber's work and fined twenty five dollars; the magistrate's remark was that the sanitary conditions of the community are of too great importance to permit incompetent and non-licensed men to do it.

The joke of it is that the grocer's plumber-brother is doing, every day in the week, all kinds of electrical work, beating the electrical contractors of their legitimate business, but nothing can be done to stop him.

Plug said that when the magistrate fined him his brains moved faster than a moving picture on a screen: he saw first himself sitting in his office figuring out the cost, profit and price for Charlie's job, the fair profit on that particular job multiplied by forty (because Wringer told him that he easily could get that many Chinese laundries attended to if he went after the business in a proper way); then he saw himself already installing electric fans and pilot lights for irons in the same laundries; then the magistrate telling him to pay twenty five dollars and, finally, Charlie accompanied by forty other Chinamen asking him: "you makee tventy fol dollas job fol sisteen? good businessman, mistel Pulg."



"Plug was fined $25.00"

The magistrate would not even listen to Plug's statement that he get's no protection, that butchers, coblers, plumbers and carpenters are doing electrical contractors work, that there is more danger to life and property from electrical work being done by incompetent men than from moving a sink; all the advice he got was: "find out how the plumbers have done it."

Ben has admitted to my husband that Plug's case as far as taking jobs at a customer's figure, even if it is at a loss, is quite a common case among electrical-contractors, and that this practice virtually establishes the low standard of payment for electrical work.

He also stated that most of them are doing it because they do not know how to properly figure out their own cost and because they have to meet competition of electrical contractors who have neither business premises to keep up, stock, nor a pay roll to meet and are doing contracting work on a basis of what they can make per day working as journeymen and contractors at the same time.

His face somewhat brightened when he said that this is going to stop soon, because they are forming an organization of the electrical contractor-dealers to protect their business, which should help in setting the house in order.

It would take many pages to report all the conversations of my husband and Socket, so I will write you again once in awhile, giving in each letter a different story of Ben's troubles as he tells them to my husband.

If any of the contractors, or their wives would care to communicate with me, they could do so by writing to you, Mr. Editor, and I hope that you would be good enough to send their letters along.

Youre very truly,
Mrs. I. M. A. Byer.

The Conversion of the Architect

To Better Wiring—A Successful Venture by the Electrical Co-operative Assn., Province of Quebec

The Electrical Co-operative Association, Province of Quebec, is continuing it's campaign for closer co-operation with the architects by sending to all of them a letter (printed below), accompanied by a suggested plan of a properly wired, medium-sized house, with standard electrical symbols.

All the electrical contractor-dealers in the Province of Quebec are also sent copies of this letter along with one addressed to them directly. The statement recommended to the contractor-dealers to be carefully read and used as an argument when selling proper wiring of a house is as follows:

Read Carefully—This was Printed in Both Languages on Reverse Side of House Plans

"Electricity is constantly making life easier, more convenient and more comfortable for everybody, and, soon, houses not thoroughly equipped for every phase of electrical service will be an exception.

"Considering the importance of the electrical equipment of the home nothing should be omitted to have the wiring right, the illumination properly provided for, convenience outlets "conveniently" placed and the materials and appliances should be what the experts have decided is nesessary for a safe, dependable and permanent work.

"The man who knows electricity, so far as it applies to the modern household, is the qualified electrical contractor, who is in close touch with the latest developments in the electrical field, who employs good workmanship, uses standard material and charges fair prices.

"Cut-rate, irresponsible electrical contracting service is always expensive and frequently disastrous.

"One seldom saves more than one-half of one per cent ($50.00 on a $10.000 house), and is likely to spend five times that amount in replacing poor workmanship and substandard materials and in supplying the needed "convenience outlets" and wall switches whose omission made the bid possible.

"The economy of the lowest bid exacts heavy penalties in electrical contracting work.

"The plumbing of a house generally costs about 13% of the total cost; a fair basis for judging the quality and completeness of the electrical wiring, excluding fixtures, of the home has been set at 5%.

"The home one builds today is expected to remain modern for ten or fifteen years; with the progress that is being made today in electrical equipment of a home, nothing but the latest and most complete features will be economical.

"Give your work to a thoroughly reliable electrical contractor, demand completeness and quality rather than cheapness of work."

Letter to Architects

"This Association is soliciting your kind assistance in adopting a uniform standard of electrical symbols in preparing building plans.

"The enclosed printed sheet of symbols, giving their names in both the English and French languages, was adopted by this Association as well as by the Electrical Contractor-Dealers Association, Province of Quebec, Incorporated, as a standard.

"It covers the designation of all the possible electrical requirements in buildings of all kinds.

"We believe that its adoption will facilitate the work of the architects, engineers and electrical contractors.

"Additional copies will gladly be supplied to you free of charge whenever you may require any; we are sending them also to all the electrical contractors to enable them to follow the plans.

"You will also find attached a suggestive plan for a properly wired medium sized house, of which we hope you may make use.

"Our aim is to have our Province a place of well lighted homes with the manual domestic work made as easy, convenient and economical as it can be accomplished by having the house properly wired for use of electric light, heat and power.

"We are anxious to have in our work the co-operation of the architects of our province, which we bespeak herewith.

"Your acknowledgment of receipt of this letter, criticism and suggestions will be greatly appreciated."

Accompanying Letter to Contractor-Dealers

"Enclosed, you will find copy of a letter sent to all the architects of the Province of Quebec with a request to use the standard electrical symbols as per enclosed printed sheet.

"The letter to the architects will explain to you the reason and purpose of it.

"We would ask you to assist the association in this work by requesting, whenever an opportunity presents itself, the architects with whom you may be doing business to make a practice of using the standard symbols in preparing their plans.

"We are anxious to develop closer co-operation between the architects and the electrical industry in which you can do your part through personal contact with them; it will eventually mean many welcome dollars in your own business.

"You will also find enclosed copy of a suggestive plan for proper wiring of a medium sized house.

"Please, use it as a minimum standard for wiring houses of that size, read and read carefully the printed statement on the reverse side of that plan, using it an an argument when suggesting to your clients a proper electrical installation. It will pay you and them.

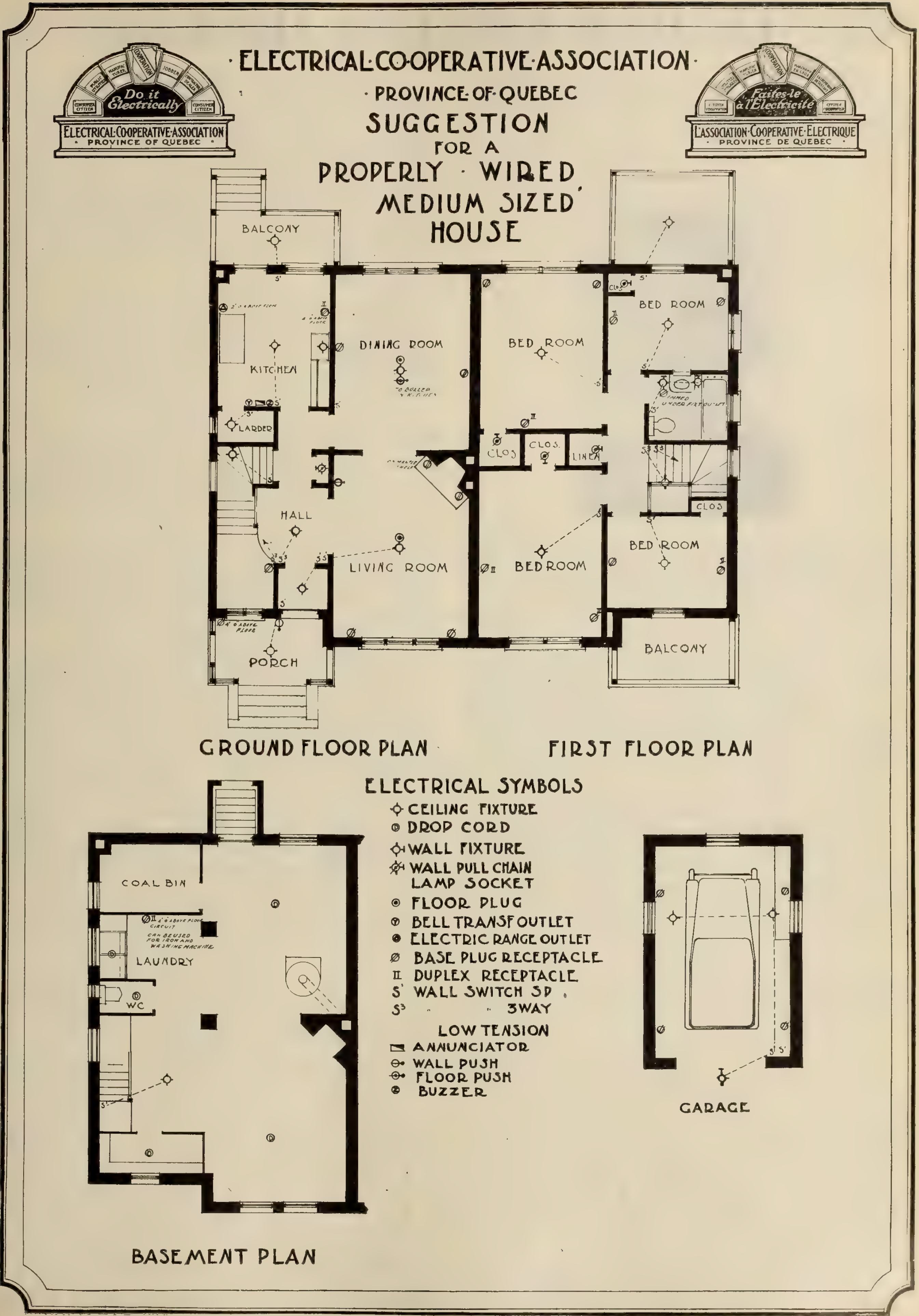
"We will be glad to supply you with copies of that plan whenever you may see an opportunity to distribute them among prospective builders.

"We are doing it for your sake and the least you can do is to assist us in this work."

Remarkable Results

This effort to make the builders of houses and the public at large realize the value, economy and convenience of a properly-wired-for-electricity house, although quite recent in the city of Montreal, is beginning to show some positive results. The Lancashire Land and Construction Company, for instance, who have built in the past close to one hundred houses **were allowing** for electrical installation a maximum of $60.00 per house. However since they became converts to this educational campaign of the Co-operative Association, they have built this year some 20 houses in which the wiring amounts to **over 200.00** dollars per house.

The 16th Annual Convention of the association of iron and steel electrical engineers will be held in Cleveland, Ohio, September 11th., to 15th., 1922.



Plan Sent to Architect by Electrical Co-operative Association, Province of Quebec

Electrical Activity in Manitoba

Mr. E. V. Caton, chief engineer for many years of the Winnipeg Hydro-electric System, has resigned to accept the position of chief engineer with the Winnipeg Electric Railway Co., replacing Mr. G. Lewis, who returns to the United States. Mr. Caton is an Englishman who came from Birmingham to install equipment for the Vickers Co. After superintending the installation of the first five units at the Point du Bois power-house, he was offered the position of chief engineer of the Winnipeg Hydro, and has held that position ever since.

Mr. E. V. Caton

Mr. Caton is chairman of the local branch of the Engineering Institute of Canada, a member of the Council of the Manitoba Professional Engineering Association, an active member of the Executive of the Manitoba Electrical Association and has written a number of articles for the trade press, including descriptions from time to time of the construction and engineering features of the Winnipeg Hydro generating and distributing plants.

Mr. R. A. Davis, of London, Ont., who represents The Consolidated Lamp & Glass Co. of Pittsburg, was a recent visitor to Winnipeg and has made arrangements whereby the Great West Electric Co. Ltd., Winnipeg, will handle his line of commercial glassware, known under the trade name of "Coralite", for Western Canada. Mr. Davis reports business as being very good in Eastern Canada.

The survey of the Winnipeg Hydro auxiliary power site at Slave Falls is making good progress. Various cross sections of the river have been taken and profiles of the power house and dam sites.

The Winnipeg Hydro are investigating the feasibility of installing wireless telephonic communication between Winnipeg and the power house situated 80 miles distant. If experiments which are being made show good results, sending and receiving sets will be installed at both ends.

Mr. Fred H. Wilson formerly with City Electrical Dept., Winnipeg, now with Chicago Fuse & Manufacturing Co., paid a two weeks visit to Winnipeg looking up his old friends.

Mr. J. Gordon Smith who has been seriously ill for the past four months is now able to pay short daily visits to his office, the Great West Electric Co. Ltd., Winnipeg.

Mr. J. G. Glassco, Manager of the Winnipeg Hydro, has put through a recommendation to the city council suggesting that they inaugurate a Publicity Bureau for the purpose of placing before the citizens, more fully, data regarding the extension of the tramway franchise. He states that the future of the Winnipeg Hydro is so vitally connected with the disposal of the street railway system, that it is important for the citizens to have the facts from the municipal ownership point of view as well as that of the street railway company, who at present issue a Bulletin known as Public Service News.

The Winnipeg Electric Railway Company has just constructed a half mile double track street car extension on Academy Road. This line serves a fast developing district, and as a result of the extension already many new homes have been built.

An extensive track rehabilitation programme is under way by the Winnipeg Electric Railway Company. When present work is completed the track on Main Street from Higgins to Redwood, a distance of about a mile, will have been renewed. The company is using the Dayton resilient tie in this construction.

Very rapid progress is being made by the Manitoba Power Co. in the construction of its new hydro-electric plant at Great Falls. The initial units in this 168,000 h.p. plant will be in operation by the coming Christmas

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The loss on the operation of the Saskatoon's electric light and power plant during June this year was $588.73—less by over $300.00 than the loss incurred during the same month last year. Comparative statistics made public by J. R. Cowley, electrical engineer, are these:

	1922	1922
Output, kw.h.	1,132,490	979,030
Expenditure	$36,152.11	$34,264.60
Revenue	35,563.38	33,362.50
Loss	588.73	902.10

Commenting on the fact that consumption of light and power in Saskatoon is increasing, Commissioner Andrew Leslie said that no funds would be available for the construction of the many extensions recently promised by the city council until the four money by-laws, to be voted on a second time on August 1, have been approved.

Fred E. Garrett & Co., 501 Confederation Life Building, Winnipeg, Manitoba, have been appointed western representatives of the Ferguson Manufacturing Company, of London, Ont. (conduit pipe fittings.)

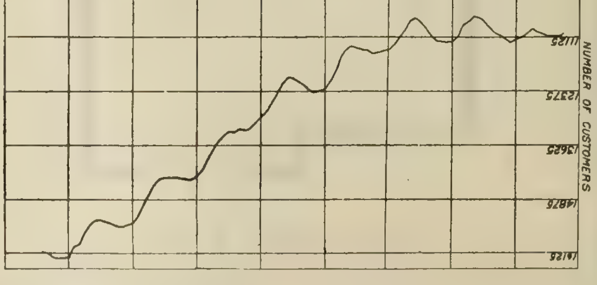

Chart Showing Increase in Customers Edmonton Light & Power Dept.

Meeting of Manitoba Electrical Association

On Thursday the 20th July, the Manitoba Electrical Association held a general meeting at the St. Charles Hotel, Winnipeg, at 6:30 p.m., the object being to receive reports from the various committees as to the programme for the ensuing year. J. E. Lowry, president of the association, after praising Morris E. Deering, retiring president, and Jim Swan, retiring secretary, for the splendid work they had done in the interests of the Manitoba Electrical Association, during the past year, stated that he felt that the association, should have local speakers at the general meeting, instead of bringing in outsiders from distant parts.
quently happens.

E. H. Smith, chairman of the Picnic Committee, suggested that during the months of August, September, and December, that the members meet only once a month, and twice a month for the remainder of the year, said meetings to last only one hour. Mr. Smith then called on Fred J. Pratt to tell those present what progress had been made in connection with the Annual Picnic of the association, Fred stated that the date of the picnic has been changed from the 3rd of August to the 15th August, on account of the Automobile Club having made arrangements to take out all the Orphans of Winnipeg on the 3rd. It is expected that the association, will take between 300 and 400 orphans to the picnic, and stated that all the members of the association, must work to put it over in as good, or better if possible, shape than last year. He also thought that the Orphan Homes should be presented with something electrical, with a name plate of the Manitoba Electrical Association on each gift.

L. B. Dickson, in the absence of Geo. Wright, who was out of the city, gave the following report on behalf of the membership committee.

It is felt by the members of the committee that membership in the Association should be of two forms, one for individuals, firms or corporations that might be termed general members, the other for those connected with firms or corporations that might be termed individual members. The general membership would be classified and the dues fixed to correspond with the ability to pay, and the benefits to be secured through the activities of the Association.

A suggested arrangement of classifications and dues, with the names of firms, corporations, and individuals that would come under these classifications, is set forth below:

1. Public Utilities.
2. Jobbers and Manufacturers Branches.
3. Local Manufacturers and Manufacturers Agents.
4. Contractor Dealers.
5. Engineers.
6. Electrical Publications.

Under No. 1 Annual Dues	$200.00
Under No. 2 Annual Dues	50.00
Under No. 3 Annual Dues	25.00
Under No. 4 Annual Dues	10.00
Under No. 5 Annual Dues	10.00
Under No. 6 Annual Dues	10.00
Under No. 7 Annual Dues	5.00

(Individual Members)

It is suggested that voting power be in accordance with the dues paid, for instance:

Public Utilities,	with 4 in class.	160 volts
Jobbers & Mfrs.,	with 12 in class.	120 volts
Local Mfrs. & Jobbers,	with 8 in class.	40 volts
Contractor Dealers	with 15 in class.	30 volts

Individual Members would be entitled to one vote each.

On the suggested scale of dues, the estimated annual income would be as follows:

1.	4	Public Utilities	at $200.00	$800.00
2.	12	Jobbers, etc.	at 50.00	600.00
3.	8	Local Manufact.	at 25.00	200.00
4.	15	Contractor Dealers	at 10.00	150.00
5.	3	Engineers	at 10.00	30.00
6.	1	Electrical Pub.	at 10.00	10.00
7.	100	Indiv. Members	at 5.00	500.00
				$ 2,290.00

The necessary expenditures as estimated, would be as follows:

Stenographer	$ 100.00
Notices, Postage, etc.	250.00
Entertainment—	
Picnic	
Dance	
Bonspiel	200.00
Contingencies	100.00
	$ 650.00

An amount of $1,640.00 would be available to further the objects of the Association. It is felt by the Committee that a special educational campaign might be undertaken during 1922, and that, for 1923, a well planned electrical show, with a Western Electrical Convention at Winnipeg, should be considered. It is also felt that the Association should investigate the advantages that might be derived from an Electrical Home exhibit.

For the purpose of canvassing the different classifications with the object of doing this effectively, the following canvassing committees are suggested for each:

1. Public Utilities: E. V. Caton; J. Whitsell.
2. Jobbers & Manufacturers Branches: W. H. Reynolds; G. R. Wright.
3. Local Manufacturers & Manufacturers' Agents: E. Deering; H. Farley.
4. Contractor-Dealers: L. B. Dickson; W. Sibbald.
5. Engineers: J. E. Lowry; J. Rochetti.
6. Electrical Publications: E. H. Chapman.

A suggested form of application blank was shown; the proposal is to secure payment of the dues with the application and, at the time of soliciting the general membership, that a record be taken of possible individual memberships connected therewith, for which payment should also be secured if convenient.

The committee is of the opinion that memberships from individuals, firms and corporations outside of Winnipeg and its immediate surroundings cannot be advantageously solicited until the association has demonstrated, by its activities, that it will be to their advantage to join.

L. B. Dickson
M. E. Deering
G. R. Wright. (Chairman)

Considerable discussion followed the report, some of those present feeling that the public utilities would have too strong a voting power. The question was put to a vote, and it was decided that the utilities should have twenty votes for a $200.00 membership.

Morris E. Deering then spoke on publicity, and explained the worth of editorial co-operation, which really had not been taken advantage of in the Electrical page of the Manitoba Free Press, Mr. Deering read the following letter from H. C. Howard:

A Sob Story With a Message for You

It is just about twelve months ago since the Manitoba Electrical Association gave birth to a chubby little product known as the Electrical Page. It only came into this world after the most careful investigation and research had been made. The paternal responsibility rests on Larry Cochrane.

While in the cradle this baby received the most dutiful attention from a number of foster parents. A great future was predicted for it and its acquisition to the electrical family of Winnipeg was hailed with delight and press notices from coast to coast.

When but a few months old it was forced to swallow a few "gin pills," and hair restorer medicines. Accustomed as it had been to the most delicate treatment, it almost expired despite the most careful nursing by Mr. Arthur Stundin. At this time a consultation took place and I was called in as a sort of wet nurse to give the benefit of my worldly experience.

Mr. Stundin left the city and I took charge of the baby, stripped it of its swaddling clothes, dressed it in knee breeches, cleared it of all the effects of "gin pills" and proceeded to make it what I thought a fairly respectable citizen. Within a short time it suffered from growing pains and it spread itself over two pages of the "Free Press." Its magnanimous foster parents were almost in danger of killing it with kindness and they so kindly regarded the investment that there was a suggestion made of having a bust made of Larry Cochrane so that future generations could worship at the shrine of the man who conceived this remarkable product. It gave back to its foster parents splendid returns in the way of increased sales, and wonderment was expressed that such a remarkable prodigy had been permitted to remain in the limbo of unborn ideas for such a long time.

Then, a remarkable change took place. Over night, as it were, the enthusiasm of the foster parents waned. The City Hydro, Northern Electric Company, Schumacher Gray, Bill Sibbald, the Winnipeg Electric Railway Company and one or two others alone continued giving it nourishment. As the weeks rolled by even some of these fell off, but still the nurse remained at the post and tried to make this anaemic and declining child appear to be a full-fledged, healthy and vigorous citizen. But the strategy of camouflage had finally to yield in the face of cold facts and the curtain was rung down on this unfortunate child two weeks ago and the body is now resting in the morgue.

The nurse has recovered from the grief which the demise occasioned and finds considerable consolation in looking over old files and glancing at the photographs of what once was so promising a youth.

So much for the manner in which this little child strutted across life's page. It died from lack of nourishment and natural causes. It has gone—BUT—there still remains its cradle, its clothes, its potentialities for doing good and benefitting the electrical world, which was its mission in life.

Decide for yourselves—is the page worth having? If it is, then don't you think it deserving of a little of the milk of human kindness. It can be revived. The habit of the electrical men in dodging their paternal responsibilities should certainly not apply to so delicate and frail a thing as an electrical page.

To pass to the serious side of the whole matter, don't you electrical men think you are passing up a wonderful opportunity in not supporting an electrical page. Just as an illustration let us take the Thermo heater. I venture to say that a half column story given gratis describing this heater, which appeared on the electrical page, did more to assist in marketing this article than did a number of advertisements, which must have cost well over $100.00.

There are endless opportunities for you electrical men to write newsy notes about the goods you have to sell, and by this means to attract the attention of possible buyers. You should not expect, you cannot expect, that the editor of the page is going to call on each of you each week to ask what you have to write about. If you can't realize the advantage of this page to you, and the possible sales medium there is in it, then you ought to wrap yourselves up in the cerecloth, hang the crepe and page the undertaker.

I really ought to apologize to Fred Pratt for encroaching on his preserves and referring to the Deity, but there is a great similarity between God and the electrical page—God helps those who help themselves. So does the electrical page.

There is big value in it. If you appreciate my efforts I will consider it an honor to continue to serve the association and edit the page. All you fellows have to do is to supply the nourishment in the form of advertising, and cooperate with me in making the page attractive to the readers through readable electric news items, and of benefit to yourselves by stimulating interest in the industry.

You have an opportunity here—and "Barkis is willing."

Yours optimistically for a Bigger and Better Association,

Herbert C. Howard.
Publicity Manager,
Winnipeg Electric Railway Co.

The Epitaph

Here lies the body, not yet cold
Oh gently drop that tear
Of a little child, not 2 years old
A child we cherished dear.
Twas claimed it was a welcome child
And praised both near and far
Its features were beyond compare
L. Cochrane was its "Pa."
It thrived and grew, and grew and thrived,
Twas a credit to its name
It helped out those in business
And tried to bring them fame.
But scarce ere yet it had been weaned
When so sad to relate
Its foster parents lost their love
And left it to its fate.
It struggled hard to make a show
"Twas pitiful to see
There's left but few friends now to mourn
While it lies "R. I. P."

Mr. Deering, read the following letter from K. N. Forbes, chairman of the committee of Public Relations, who was out of the city, the report was heartily approved of.

Manitoba Electrical Association
Report of Committee on Public Relations

This report can only be considered as a preliminary one, and for submission to the meeting of the Executive on Monday the 17th instant, inasmuch as one of the members, Mr. Whitsell, has been absent from the city, and the objects are such as will require considerable thought and negotiations. This report therefore, should be looked on more in the nature of a suggestion for your consideration, the following having been talked over by Mr. L. B. Dickson and the Chairman.

The Retail Merchants' Association: Inasmuch as this Association has a division classified under the heading of "Contractor dealers" whose activities are such as bring them in closer relationship with the Retail Merchants' Association, a committee of this division should communicate with the Secretary of the Retail Merchants' Association with a view to seeing how the interests of the electrical industry may best be furthered, as they naturally have certain matters in common.

Board of Trade: We believe it would be of considerable advantage to this Association if arrangements could be made through the Secretary of the Board of Trade to have two of our members appointed to their council or such committee as electrical matters could be dealt with, and through these members to enlist the support of the Board of Trade for the proposed electrical home.

Rotary, Kiwanis, Gyro and Lions Clubs, and The Canadian Credit Men's Association: An effort will be made, with your approval, to have an invitation extended to one of our members to give a talk at one luncheon meeting of each of these organizations, for the purpose of stimulating a wider spread interest in the electrical industries and the benefits to the city on account of the electrical development which is in progress at present.

Public Auditorium: Your committee purposes co-operating with the Board of Trade and any other properly authorized bodies in an effort to have a suitable public auditorium built in a central location in the city, so that Winnipeg may be possessed of a creditable building with the necessary facilities for public gatherings and exhibitions, and will endeavor to see to it that the electrical installation and equipment will be of the very latest type, and of an educational character.

Builders' Exchange: The Committee purposes approaching the Builders' Exchange in an effort to secure their co-operation in the building of the proposed electrical home.

Electrical Exhibition for 1923: While this subject may not properly come within the jurisdiction of your Committee on Public Relations, we think it would not be amiss on our part to suggest that the Publicity Committee endeavor to have an electrical show put on in the early part of 1923 in conjunction with an electrical convention which might embrace the entire west.

Remarks: It is very difficult, in the time at our disposal, to lay down any comprehensive programme along the lines suggested in your instructions, but it is the intention of your committee to take advantage of such opportunities as present themselves from time to time, with the object of further establishing our public relations and furthering the interests of the electrical industries.

Respectfully submitted,
Committee on Public Relations.

Mr. Lowry, suggested that the Association should hold a golf tournament, and very kindly offered a cup, to be known as the Presidents Cup, which offer was gladly accepted.

What Per Cent Does Your Money Earn?

Suppose a business man in whom you had perfect confidence walked into your office some morning and asked you to lend him $100. at 36%. Suppose a man to whom you owed $100. came in and said; "if you will pay me right now, I will accept $65." If your conscience did not prick you, you would jump at either offer, and if you did not have the money in your pocket or in the bank, you would make arrangements with the bank to loan you the necessary money for 6½ or 7%.

This in effect is the offer your manufacturer or jobber makes to you with every account he renders on a basis of 2%, 10 days, net 30 days. If you accept his offer you are making 36% on your money. If you do not accept his offer you are doing what is equivalent to paying 36% yourself in the meantime.

It is a rather remarkable fact that a very large number of contractors and dealers do not take advantage of this splendid opportunity to make their money work for them. It is poor business to neglect these discounts, and excellent business to take advantage of them. As a matter of fact the rate offered is so high that certain manufacturers are considering the advisability of reducing the 2% to 1%, which would be still equivalent to allowing a discount of 18%.

Just consider for a moment what this may mean in a year. Suppose a contractor were doing business in a small way and his accounts amounted to only $100. a month; his monthly discounts would be $2.00, and his yearly saving from this source $24.00. Here is a case where a man with $100 capital, turned over every month, makes 24% on it, merely through taking his discounts. A turn over of $1000 a month would yield, in the same way, a profit of $240. a year.

There is no other source of income that yields so high a return to the merchant as this opportunity of discounting his bills. Never fail to take advantage of it. It is important enough to represent the difference between success and failure.

Some one may ask how the 36% is obtained. It works this way; 2%, 10 days, net 30 days, means that your bill of $100 is due 30 days from to-day. You are allowed 10 days grace, and if at the end of ten days (or at any time during that period) from the date of your invoice you are in a position to pay the bill you get a discount of $2.00 i.e. you pay $98. That $2.00, represents interest received for a period of 20 days, which is at the rate of $36. for 360 days.

Whatever else you may fail to do, therefore, always make arrangements to take advantage of your discounts. Many a man has found at the end of the year that this source of resource has saved him from financial trouble.

Is Business Better With You?

Business is undoubtedly better—much beter—and it is improving right along. And here is a little secret too Business has shown the greatest improvement with those individuals and firms that have put forth the greatest effort to bring business back to a satisfactory stage and have gone out and pulled the clouds away from the face of prosperity by main force!

Are you getting your share of business? If you are, you know that you owe it to hard work. If you are not, you have no right to blame anyone but yourself—because there is business to be had.—Hoovergrams.

The Johns-Pratt Company of Hartford, Connecticut, whose selling arrangements through the Johns-Manville Company were recently dissolved by mutual consent, have established a New York office located in the Liggett Building, 41 East 42nd Street. It is intended to have a complete representation at this office for the three departments of the company—Noark fuses and protective devices, Vulcabeston packing and Johns-Pratt molded products.

The second annual report of the Scientific and Industrial Research Council of Alberta, recently received, constitutes a complete review of the work done under the direction of that body during the year 1921. Research was carried out on coals, road materials, salt deposits, boilers, etc. The authoritative nature of the information contained renders the report valuable to those interested in the resources of Alberta.

What Contractor-dealers Say

In general, contractor-dealers are busy with wiring work. Appliances are moving at about the usual rate though special conditions are affecting the sale of some lines, such as fixtures, fans and heaters. Prices are mostly steady, with slight reductions in some lines. Building is increasing and there promises to be activity in this line for some time to come, which movement will, of course, be reflected in the electrical business. Some contractors report a brisk demand in old house wiring.

Fixtures—Medium-priced residential types are in good demand, due to activity in building industry.

Fans—The unusually cool summer has not helped the sale of fans, and dealers report this business not up to last year.

Radio—Radio equipment business is fair in spite of static conditions and usual summer lull.

Cleaners—These are moving well in some sections due to special sales effort by dealers.

Lamps—Prices steady, and stocking up for fall needs is going on.

Bell-ringing Transformers—This is another line that has been favorably affected by home-building activity.

Wire—There is a consistent demand for wire due to the activity in house building. Prices remain steady.

Rigid Conduit—Prices steady, brisk demand.

Farm-Lighting Plants—It is predicted that the improvement of conditions in the West will result in a larger demand this fall.

Heaters—The prospects of a coal shortage are causing some activity in this line.

Trade Publications

A well illustrated catalogue, No. 53 E, has recently been issued by Nerlich and Co., 146-148 Front Street West, Toronto. A variety of electrical fixtures and glassware are listed, as well as electric lamps in table portable, utility, desk, boudoir and floor styles. Lines of flash-lamps and heating appliances are also shown.

A line of motor starters which afford complete protection to the operator and the motor has been developed by the Westinghouse Electric & Manufacturing Company. These starters are fully described in a publication, Folder 4500, recently issued by the Westinghouse Company.

The Duncan Electrical Company, Montreal are showing a supplement (Number 1) to their Catalogue Number 7. This supplement contains illustrated descriptions of a number of new lines now being manufactured by this company, including push button canopy switches, pendant switches, feed through switches, receptacles, plugs and caps of various kinds.

A new publication on street lighting is being distributed by the Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa. The publication, Folder 4439, "Turning Night Time into Day Time" shows the advantages of adequate illumination, describes some of the Westinghouse lighting fixtures, and gives illustrations of a number of the company's typical city installations. One of the products described is the Westinghouse disconnecting pothead, which is supplied in all Westinghouse light posts. This device automatically disconnects the wires from the underground circuit in case the pole is broken and also completes the cable circuit so that the other lamps on the street will not go out.

Personal

Mr. A. E. Morrison of Wellington, Ont., electrician employed by the Dominion Canning Co., reports a very narrow escape recently when a high voltage wire came in contact with a pair of pliers in his hip pocket.

Mr. C. W. Stokes, Montreal manager of the English Electric Co., has resigned and will engage in business in Montreal. Mr. Stokes has been with the English Electric Co., and its predecessor, the Siemens Co., of Canada, for some twelve years and has had a wide and varied experience.

Fred R. Miller, of the firm of Roger Miller & Sons and a member of the Transportation and Hydro-electric Commissions, was operated on recently for tissue adhessions. The operation is said to have been successful, and Mr. Miller is expected to be around in two or three weeks' time.

Messrs. J. Alex. Regan, and T. J. McFadden, Quebec and Ontario representatives, respectively, of the Diamond State Fibre Company of Canada, Limited, have recently returned from their holidays. Mr. Regan's vacation was spent along Lake Champlain and at Wilmington, Del., and Mr. McFadden's in Northern Ontario.

Mr. I. W. Levine, for the past eight years associated with the Electrical Equipment Co., Ltd., Montreal, has resigned to enter a larger field, and one offering a wider scope for his ability and ambition. Mr. Levine is the direct representative, for Eastern Canada, (with headquarters at Montreal) of the Federal Porcelain Co., Carey, Ohio; of Smith & Stone, Limited, Georgetown, Ont., and Electrical Fittings & Foundry Ltd., Toronto.

Mr. Eugene Vinet who has been connected in various engineering and organization positions with the Shawinigan Water & Power Co., for the past 16 years since, and prior to, his graduation from McGill University in electrical engineering, is now employed by the Middle West Utilities Co. of Chicago, Ill., as assistant to G. W. Hamilton, supervising engineer over all companies controlled by the Middle West Utilities Co. Mr. Vinet was secretary-treasurer of the Canadian Electrical Association for the past two years and, as already announced, has been replaced in that capacity by Mr. Louis Kon.

Company Incorporations

L'Industrie Lemay & Fils, $49,000, L'Ascension, Que. Generation, etc., of electric power.

Ontario General Omnibus Co., $600,000, Toronto, Ont. Operation anywhere in province.

Rural Light & Power Co., $45,000, Yamaska, Que. Construction and operation of transmission lines.

Electric Lighting Products, Ltd., $40,000, Toronto, Ont. Manufacturing, etc., of electric appliances.

La Compagnie Hydraulique de Portneuf, Ltee., $300,000, Quebec. Generation, transmission, etc., of electric power.

Radiophone Corporation of Canada, Ltd., $500,000, Toronto. Manufacture, etc., of radio equipment.

Cresent Electrics, Ltd., $100,000, Toronto. Manufacture, etc., of machinery and other goods.

Canadian Electrical Equipment Co., Ltd., $10,000, Toronto. Manufacture, etc., of electrical and other machinery.

Electric Lighting Products, Ltd., $40,000, Toronto. Manufacture, etc., of all kinds electric appliances.

Current News and Notes

Annapolis Royal, N. S.

Work has been started by the town council on an extension to the electric lighting system from Lower Town to Evansville. The chairman will buy 1 or 2 carloads of poles, 3 or 4 miles of copper wire, 33 street lamps and 300 lights.

Burlington, Ont.

Expropriation proceedings are to be taken against property owners at Hamilton Beach, who have refused to fix a price on their lands across which the new Hydro-Electric transmission line, from Queenston to Toronto, runs. This decision was made recently at a meeting of the commission when the right-of-way department was authorized to take this step.

Campbellford, Ont.

In a recent storm a bolt of lightning struck the municipal power station and completely paralyzed the power and light situation. Two switch panels were burnt out as well as the coils on the generator. A smaller generator is being operated and sufficient current is being generated to supply the lighting needs of the village. Since the recording meter shows no surge on the line at the time the damage was done, it is thought that the building itself was struck and not the wires. It was also pointed out that most of the damage was caused by the fire which resulted and not by the lightning. James McMullen who was in charge of the plant at the time escaped injury.

Chatham, Ont.

While at work on the new office building of Dr. Shirley Holmes on Sixth street last evening, Herman Cartier, local electrical contractor, fell to the ground, sustaining a severe injury to his back. After first aid was rendered, the injured man was removed to his home. He will be able to resume his duties in a few days' time.

Cobalt, Ont.

The Timiskaming Telephone Company, in a circular sent out recently to its subscribers, has announced its readiness to discontinue its service in Cobalt if the town council insists, rather than consent to a franchise granting rentals on the same basis as those in force in Haileybury and New Liskeard. Cobalt rates are higher and the council will consider the question of offering the company a franchise at the lowest rates or alternately leaving the town. The company has operated for the past five years without a franchise in Cobalt.

Hastings, Ont.

The victory at the polls for the by-law authorizing municipal assistance to Charles Fowlds for generating power for the village ensures Hastings of a supply of power at $20 a horse-power. The by-law was first submitted about two months ago, and was defeated by a majority of two votes, but on second submission it was carried by a majority of 21. Mr. Fowlds owns outright the water rights in Hastings, the deed to which was obtained in 1861.

Kingston, Ont.

The Street Railway Company, in order to meet the city in regard to further paving operations along the railway line , will agree if the Council will amend the present agreement as to fares and permit the company to collect a cash fare of six cents, instead of five cents. To relay tracks with heavier iron it must increase its revenue in this way.

Kitchener, Ont.

A radio broadcasting station has been installed by the Daily Record. The set operates on a wave length of 420 metres covering a radius of 60 miles.

That the property owners of Kitchener are overwhelmingly in favor of improving the street railway equipment and service is evident in the recent vote for the street railway bylaw. The bylaw was carried 421 to 26, leaving a majority of 395. The bylaw is to raise $70,000 for the purpose of purchasing three new up-to-date cars, to build new car barns and to improve the present system by an increased double trackage.

It is said that investigation is being made of the possibilities of a trackless trolley system in Kitchener for extending the service.

Ottawa, Ont.

The Standard Underground Cable Co., of Canada, Sherman Ave. N., Hamilton, Ont., has been awarded the contract by the Ottawa Hydro Electric Commision, 100 Bank St., for high and low tension cable.

At a meeting of the Ottawa Hydro-electric Commission held recently the contract for 23,000 feet of high-tension cable and 16,000 feet of low-tension cable was awarded to the Standard Cable Company of Montreal, at a price of $54,500. The tenders were in bulk and the tender price of the Standard Cable Company was $500 less than the next bidder.

Owen Sound, Ont.

Messrs. E. F. Pigeon and N. R. Easter of Owen Sound have recently started an electrical contracting and merchandising business, at 1033 2nd Ave. East, Owen Sound. They are carrying a full line of electric fixtures and supplies.

Peterboro', Ont.

G. N. Gordon, K. C., M. P., has protested to the local commission against seasonal manufacturing, such as canning factories, being provided with power at this time of the year. He stated that the manufacturers who purchase power for the whole year were cut off either entirely or part time, while the canning factory ran a few weeks and then shut down, to the injury of the plants that were keeping men employed every working day in the year. He claimed that these plants should put in steam because they are operated only for a short time, while the manufacturing plants in Peterboro' and other cities, carrying out large contracts which they had agreed to fulfill, should not be cut down.

Queenston, Ont.

The third of the Hydro Electric Commission's huge 60,000 horsepower generators at the new Chippawa Plant at Queenston was given its initial run on July 25 without mishap. After a preliminary tuning up, which may require from a week to ten days, Number Three, as it is known at the Chippawa power house, will commence delivery of power to the Hydro's lines in Western Ontario. The conclusion of the third unit will bring the total of power available from Chippawa to 175,000 horsepower.

Quebec, P. Q.

At a meeting of the board of directors of the Quebec Railway Light, Heat and Power Company. President E. A. Robert in an exhaustive review of the situation, gave indications of future expansion and prosperity for the company and its affiliated interests.

The financial statement for the first six months of the fiscal year ending June 30th., shows gross earnings of $1,346,918 as compared with $1,359,514 for the corresponding period a year ago. Operating expenses and fixed charges for the first six months this year are $1,230,066, as compared with $1,364,996, leaving a net surplus of $115,952 as compared with a net deficit of $5,481 for the same period in 1921, showing an improvement of $121,434 for the first six months of 1922 as compared with the same period in 1922.

The following directors were also present, Col. J. E. Hutchinson, K. B. Thornton, A. C. Parker, N. Z. Valiquette and Senator Lorne C. Webster.

St. Catharines, Ont.

The Niagara, St. Catharines & Toronto Railway Company is experimenting with a new trolley wheel. The new wheel, which is egg-shaped, does not revolve, but slides along the trolley wire, and is fashioned to do away with the constant slipping of the trolley poles, causing delays.

St. John, N. B.

Work has been started on a transmission line between St. John, N. B. and Moncton, N. B., by the New Brunswick Electric Power Commission, the first section will be erected by W. I. Snook, c/o Royal Hotel, St. John, N. B., second section by Maritime Construction Co., Fairville, N. B., and the third section by McNab Construction Co., Halifax.

On the opening of the meeting of the Common Council in committee recently, the Mayor said he had received copies of the contract proposed by the N. B. Hydro Commission for the supply of energy from the Musquash to the city. He also said he was not yet ready to present his report, as the information he desired to secure and which had been promised him had not been sent.

Saskatoon, Sask.

The contract for electrical work on the collegiate institute, Caswell Hill, has been awarded to the Electric Shop Saskatoon, at a bid of $5,363.74; other bidders were, Wheaton Electrical Co., $5,990.; General Electric Co., $6,775. It is said that the plans will be slightly revised, which will probably reduce the contract price of general contract and electrical work.

Toronto, Ont.

A severe lightning storm recently damaged the insulators on the transmission lines and an oil switch in the Niagara station of the Toronto and Niagara Power Company. Part of the load was picked up by the Hydro lines and was carried until the Toronto and Niagara power lines were in service again.

Windsor, Ont.

Telephone service along the border here is badly disrupted as result of electric storms during the week, no fewer than 300 phones, business and residential, being out of commission. Repair work here, will not be completed for ten days. Whole circuits in residential districts were put out of commission by the lightning.

Rejecting the recommendation of the Finance Committee to allow increased rates for business telephones as requested by the Bell Telephone Company, Sandwich Town Council will join with Windsor in taking the case to the Dominion Railway Board,

Winnipeg, Man.

The question of extending the franchise of the Winnipeg Electric Railway Company, the tram system of this city, for a period of ten years is being discussed with an increasing interest by the citizens. Whenever the question of extending the franchise of the tram company is raised, there has been a substantial opposition in the city council, which has so far succeeded in preventing action. The last proposal was to guarantee the bonds of the tram company and allow them to get the money for the needed extensions. It is said that this the company is unwilling to accept; they insist they can get the money if they get the extension of time.

Wiring Contracts Awarded

Barrie, Ont.

W. Robinson, $4,000 res., 6 Eccles Street.

Birchcliff, Ont.

Smart & Walsh, 130 Bingham Ave., Toronto, $7,000 each, 2 stores; $6,000 each 3 res., Birchcliffe Ave.

Brockville, Ont.

A. G. Dobbie & Co., King Street, W., $10,000 store, King & Bethune Sts.; $25,000 masonic temple, George Street.

Bridgeburg, Ont.

Wm. Simpson Co., Queen St., Niagara Falls, $40,000 school, Wintermute.

Anger Electric Co., $4,000 each, 6 res. Phipp Street.

Calgary, Alta.

Cunningham Elec. Co., Lineham Blk. warehouse, 11th Ave., 8th & 9th Sts.

Brotherston Electric Co., wiring on clubhouse, G.W.V.A.

Cap De La Madeleine, Que.

P. E. Lacroix, Pont St. Maurice, $6,000, 2 flats, St. Alphonse St.; $8,000, 6 tenements, Rocheford & Montplaisir Sts.

Cobourg, Ont.

Geo. Lowe, King St., $12,000 add., school.

Cochrane, Ont.

Reed & Son, $5,000 res., 5th Ave.; $5,000 res., 4th Ave.

Fort William, Ont.

Fort William Electric Co., 107 S. May Street, $50,000 add., to school, Franklin Street.

Fredericton, N. B.

Wm. Boone, South Devon, York Co., $20,000 add., hotel, Westmoreland Street.

Grantham Twp, Ont.

Clifford Electric Co., 19 Ontario Street, school.

Guelph, Ont.

A. N. Knowles, London, Ont., on Guelph Collegiate. Cost of building, $350,000. Architects, Hutton & Souter, Hamilton, V. K. Stalford, consltg. engr.

Hamilton, Ont.

J. A. Dynes, Prospect St., $20,000 apts., Main & Emerald Streets.

Islington, Ont.

Albert Dunk, 18 Lynden Ave., Toronto, $4,500 res., Nesbitt Ave.

H. F. Bigham, $5,000 res., Kipling Ave.

Kitchener, Ont.

Otto Reiber, 84 King St. S., Waterloo, $4,500 res., Irvine St.

Star Electric Co., 91 West King St., $5,000 res., Mansion St.

Lakeview, Ont.

Harris & Marson, 81 A. Parkway Ave., Toronto, $32,000 add. school opp. Rifle Ranges.

Lindsay, Ont.

Aylesbury & Brewer, $6,000 res., Albert St.

Lindsay Electric Wiring Co., $4,000 bungalow, Vambridge St. N.

London, Ont.

Bowley Electric Co., 306 Dundas St., $15,000 rebldg. store.

Moncton, N. B.

G. F. Perry, Main St., $4,500 res., Highfield St. extn.

Wm. G. Crowley, St. George St., $7,000 res., Elm & Gordon.

Montreal, Que.

H. R. Cassidy, 255 Regent St., $7,000 gasoline stn., Cremazie & St. Lawrence Blvd.

Cdn. Comstock Co., 10 Cathcart St., $1,000,000 Office Bldg., Guy & Sherbrooke.

M. Deschenes, $15,000 res., DesJardins St.

U. Houle, 150 Eadie St., $4,500 res., 125 Lecarnon St.

D. Goulet, 239 Edouard Charles St., $18,000 res., St. Hubert St.

Mr. Larmond, $8,000 res., Forsyth St.

E. Marcotte & Freres, 450 Roy St. E., $15,000 alt. & add. to apts., 198 Mance St.; $45,000 apt., Jeanne Mance St.

Mr. Meloche, $16,000 alts. to res., 345 Sherbrooke St. E.

Wm. Rochon, 454 Lafontaine Park, school, Stadacona St.

J. A. St. Amour, 2171 St. Denis St. monastery, N.D.G. Ave.; $22,000 res., Denis & Beaubien Sts.

J. A. Anderson & Co., 205 Mansfield St., $75,000 cafeteria, 459-71 Philips St.

A. Barbeau, 1469 Ontario E., $10,000 res., Des Erables St.

Booth Bros., 5727 Sherbrooke W., $15,000 stores, Sherbrooke St.

Crown Electrical Co., 169 Ontario St., $7,000 res., 91 St. Alexander Street.

Collyer & Brock, 131 St. Alexander St., $30,000 bldg., Pine Ave.

R. S. Muir & Co., 32 Park Ave., $20,000, 2 res., Wilson & Cote Sts.; $18,000, 4 flats, Grosvenor Ave.; 3 res., Draper Ave.

J. Thibodeau, 847 Marie Anne E., $11,000, 3 flats, 93 Fabre St.

Niagara Falls, Ont.

E. Thomas, 121-2nd Ave., $3,000 res., Fourth St.; $3,000 res., Maple St.

Scott & Hughston, c/o owner, $85,000 transformer station, South St. & Victoria Ave.

North Bay, Ont.

Herbert & Co., $4,500 res.

Outremont, Que.

J. A. Roy, 2561 Park Ave., $95,000, 22 suite apt. house, Durocher & St. Viateur.

Ottawa, Ont.

W. Stewart, 385 Daly Ave., $5,500 res., Kenora Ave.; $5,800 res., Chapel St.; $7,000 res., 1st. Ave.; $5,000 res., Pansy Ave.

W. Cowell, Westboro, $4,200 res., Hampton Ave.

P. Ackroyd, 420 Bank Street, re-wiring city police station; also on residence, Harmer Ave., for Superintendent Tobin of Ottawa Electric Railway Co.

H. L. Allen, 272 Bank St., $10,000 res., Willard Street.

H. Hardy, Ella St., $5,500 res., Fairmont Ave.

Port Dover, Ont.

J. H. Young, $5,000 res., 1st Ave.; $4,000 garage.

E. Steele, $3,800 res., St. Andrew St.; $3,000 res., McNab St.

Richardson & Cross, 81 King St., E., factory Hurlbutt Shoe Co.

Preston, Ont.

H. H. Depew, Edmonton, $136,363 hospital bldg. Contract price $2,593.

Saskatoon, Sask.

Wheaton Electric., 2nd Ave., $40,0000 college, 8th St.

St. Hyacinthe, Que.

J. A. St. Amour, 2173 St. Denis St., $700,000 hospital, Hotel Dieu.

St. Mary's, Ont.

A. Willard, $40,000 add. factory, Hurlbutt Shoe Co.

Sault Ste Marie, Ont.

J. H. Stearns, 112 Lansdowne Ave., $5,000 res., Dennis St.

O. C. Carney, 516 Queen St. E., $8,000 res., Summit Ave.

Penfold & McBride, 76 Pim St., $6,000 res., Pim St.

St. Catharines, Ont.

J. Desand, 187 St. Paul St., $3,500 res., Russell Ave.

H. C. Holmes, 30 Ann St., $3,000 res., Linwood Ave.

A. B. Cudney, 22 Thomas St., $5,000 res., Queenston Rd.

St. Laurent, Que.

Eug. Choquette, 2090 Park Ave. Mtl., $31,000 school.

Stratford, Ont.

W. J. Gaul, 78 Charles St. $10,000, 3 res., Avon St.; $3,500 res., Norman St.

Toronto, Ont.

Art Electric Co., 335 Yonge St., $20,000 res., 34 Rosedale Rd.

P. J. Dunn, 490 Quebec Ave., $7,500 each, 3 res., Patterson Ave.

Dunsford & Young, 649 College St., $6,500 each, 8 res., Melita Ave.

J. B. Forsey, 159 Wychwood Ave., $18,000 res., Graham Rd.; $7,000 res., Slade Ave.

Housekeeping Electric Co., St. Clair Ave., Six 6-family apts., $25,000 each, Humewood Court.

L. Hollows, 1564 Danforth Ave., $7,000 a pr., 3 pr. res., Osborne Ave.; $7,000 a pr., 6 pr. res., Lawlor Ave.; $8,000 a pr., 2 pr. res., Lawlor Ave.; $6,000 pr. res. Lawlor Ave.

J. H. Harris, 683 St. Clair Ave. W., $20,000 store, 1258 Yonge St.

Harris & Marson, 81 A. Parkway Ave., $137,751 nurses' home, Riverdale Pk. Contract price $2,935.; $40,000 school, Runnymede. Wiring contract price, $666.

Neilson & Co. c/o owner, $8,000 each, 2 res., Patterson Ave.

Nichol & Fagan, 111 Logan Ave., $8,000 a pr., 10 pr. res., Lawlor Ave.; $8,000, 2 pr. res., Scarboro Road.

Perrin & Hallam, 258 Laughton Ave., $12,000 each, 2 res., 6-7 Breamore Gdns.

H. Phillips, 36½ McGill St., $10,000 res., Turner Rd.

Ramsden & Roxborough, 36 Front St. E., $200,000 physicians' bldg., Bloor Street.

Smart & Walsh, 130 Bingham Ave., $60,000 memorial hall, Silverbirch Ave.

B. C. Taylor, 25 Marchmont Rd., $10,000 res., Glendale Ave.

Taylor Bros., 25½ Norwood Road, $5,500 store, Kingston Rd.

S. Trevelyan, 139 Tyrell Ave., $7,500 each, 4 bungalows, Rushton Road.

W. A. Dean, 146 Jarvis St., $35,000 school, Glebeholme Blvd.

Automatic Telephone and Time Recorders Ltd., telephone service, on $150,000 apt. house, King St.

New Toronto, Ont.

Edgery & Co., $6,000 each, 3 res.; $18,000, 3 res.

Truro, N. S.

Walter Smith, $4,500 res., Brunswick St.

Verdun, Que.

W. Quesnel, 394 St. Timothee St., $6,300 res., St. Joseph St.; $6,300 flats, St. Joseph St.

Winnipeg, Man.

Star Elec. Co., 185 Lombard St., add. to grain exchange.

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R. S. Muir & Co., 32 Park Ave., $18,000 each, 6 cottages, Victoria Ave.

Waterloo, Ont.

Wm. Reiber, 39 Cedar East, $10,000 res.

Otto Reiber, 50 Queen St. N., $4,000 res., King & Spring Sts.

Wanted—Mechanical Draftsman, preferably familiar with Electrical work. Must be experienced. Send outline of experience and salary expected to Box 976, Electrical News, Toronto. 16-17

Position wanted—as an electrical repair man with large concern in the city. My present position is with a large firm in Michigan, U.S.A. which position I have held for three years. I also have had two years experience in house wiring and contract work. I am steady, honest and sober. Apply Box 992 Electrical News, Toronto. 17

Position wanted—by energetic, single man age 32, technical training and eight years' practical work, with largest steel, copper and coal concerns in East and West, at present in Northwest mining town and desires to move East. Any commercial or industrial opening with prospects acceptable. Box 958, Electrical News, Toronto. 14-16

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1 CROCKER WHEELER—150 H.P. 750 R.P.M. 550 volts 25 cycle 3 phase slip-ring 3 bearing Induction Motor with slide rails pulley and secondary controller for two minute starting duty only. With controller is furnished one primary interlocked oil switch with No-voltage and overload relays.

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Norsk Dynamo Verksted
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16

Selling Points of Electric Sewing Machines

Why should a woman buy an electric sewing machine in preference to a treadle driven one, or having a treadle driven machine why should she buy a motor for it?

A motor driven sewing machine will turn out better work in less time and with less fatigue than a treadle driven machine. Better work because of more flexible and positive control and because the operator can devote her entire attention to handling the goods on which she is working, not being distracted by the effort of propelling the machine. The work is done more quickly because the electric motor permits the machine to stitch faster than if driven by foot power and greater average speed can be maintained because of better control of the work in hand. There is less fatigue because all of the strenuous physical effort is eliminated.

Every woman likes pretty clothes and likes to have her children dressed becomingly and well. These things are all possible at a minimum of expense and exertion with the electrically driven sewing machine.

Reliable figures show that 50 per cent of the cost of outer garments can be saved by electrification of the sewing machine, 25 per cent on under garments, from 25 to 35 per cent on children's garments and 15 per cent on flat work. These figures depend, of course, on the thrift of the housewife.

From a standpoint of comfort and health, without exception, there are no treadle machines which will permit the user to sit straight when using the machine. The strain of constantly bending to the side to operate the old type of machine is the cause for many aches and headaches, all of which is eliminated through sewing the electric way.

Then again the practical type of machine makes it possible to sew in any room in the house, or on the porch, anywhere that there is an electric socket. Overcoming belt trouble does away with one of the most unpleasant features of the sewing machine.

Sources of Trouble in Domestic Appliances

To determine the causes of trouble with domestic appliances and their possible elimination, the Society for Electrical Development has addressed central stations and dealers throughout the country.

As a result of the many replies received certain weak points common to each device will be brought to the attention of manufacturers, in the expectation that these weaknesses can be obviated to a considerable extent. In general the replies showed that the chief causes of trouble in motor driven appliances such as washing machines and vacuum cleaners were due to carelessness in operation. Failure to lubricate being the chief source of trouble. In relatively few cases were the breakdowns due to defective design.

Many cases were directly attributable to the connecting of appliances to lamp sockets, especially of the key type designed to carry only 250 watts. With iron and vacuum cleaners much trouble is experienced with the wearing out of extension cords, and the breaking down of sockets from both electrical and mechanical strain.

All of which points to the importance of educating the public to put in convenience outlets, and replacing the flexible cords when worn—only the highest grade cord should be used, and in the case of heating appliances this should be asbestos covered with ample capacity for the current required.

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50	h.p.,	3 ph.,	60 cyl.,	550 volts,	970 r.p.m
50	h.p.,	3 ph.,	25 cyl.,	550 volts,	720 r.p.m.
35	h.p.,	2 ph.,	60 cyl.,	200 volts,	1150 r.p.m.
30	h.p.,	3 ph.,	25 cyl.,	550 volts,	750 r.p.m.
30	h.p.,	3 ph.,	25 cyl.,	550 volts,	1500 r.p.m.
25	h.p.,	3 ph.,	25 cyl.,	550 volts,	750 r.p.m.
15	h.p.,	3 ph.,	25 cyl.,	220 volts,	720 r.p.m.
15	h.p.,	3 ph.,	25 cyl.,	550 volts,	750 r.p.m.
15	h.p.,	3 ph.,	60 cyl.,	220 volts,	1200 r.p.m.
13	h.p.,	3 ph.,	25 cyl.,	550 volts,	700 r.p.m.
10	h.p.,	3 ph.,	66 cyl.,	220 volts,	1333 r.p.m.
7½	h.p.,	2 ph.,	60 cyl.,	200 volts,	1120 r.p.m.
5	h.p.,	3 ph.,	60 cyl.,	550 volts,	1750 r.p.m.
5	h.p.,	3 ph.,	25 cyl.,	550 volts,	1500 r.p.m.
3	h.p.,	3 ph.,	60 cyl.,	550 volts,	1750 r.pm.
3	h.p.,	3 ph.,	60 cyl.,	550 volts	1120 r.p.m.
3	h.p.,	3 ph.,	25 cyl.,	550 volts,	1500 r.p.m.
3	h.p.,	3 ph.,	25 cyl.,	550 volts,	1400 r.p.m.
2	h.p.,	3 ph.,	60 cyl.,	550 volts,	1750 r.p.m.
2	h.p.,	3 ph.,	25 cyl.,	550 volts,	1440 r.p.m.
2	h.p.,	3 ph.,	25 cyl.,	550 volts,	1400 r.p.m.
1	h.p.,	3 ph.,	25 cyl.,	550 volts,	1500 r.p.m.
1	h.p.,	3 ph.,	25 cyl.,	110 volts,	1420 r.p.m.
1	h.p.,	3 ph.,	25 cyl.,	220 volts,	710 r.p.m.
½	h.p.,	1 ph.,	60 cyl.,	110 volts,	1725 r.p.m.
1/6	h.p.,	1 ph.,	60 cyl.,	110 volts,	1725 r.p.m.
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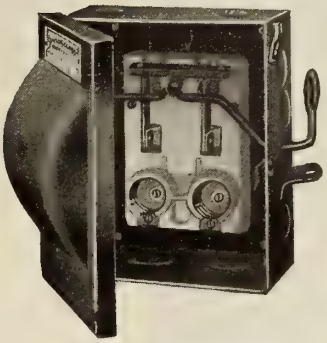

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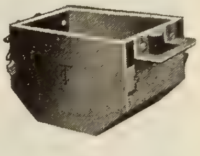

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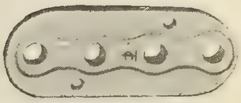

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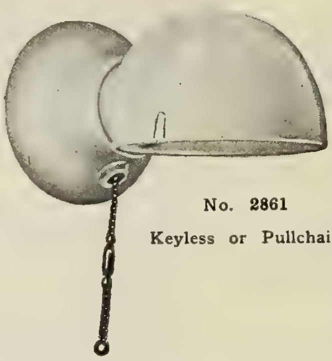

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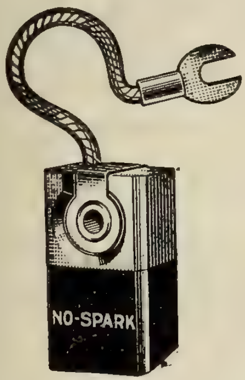

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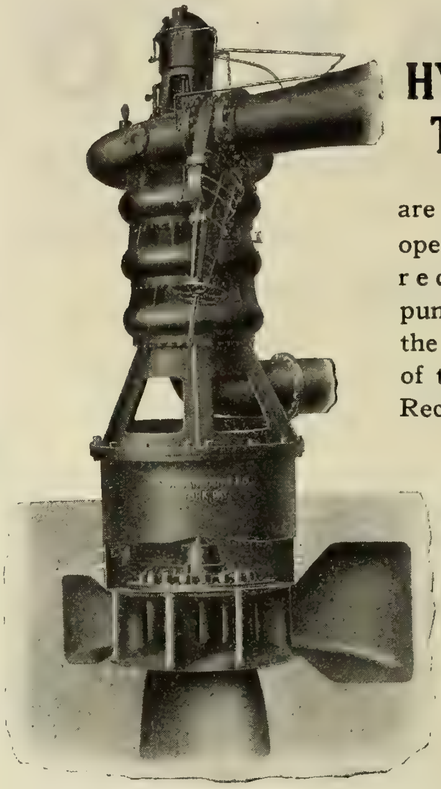

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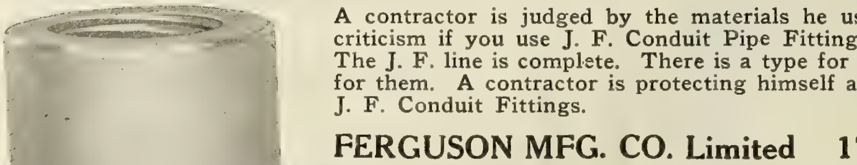

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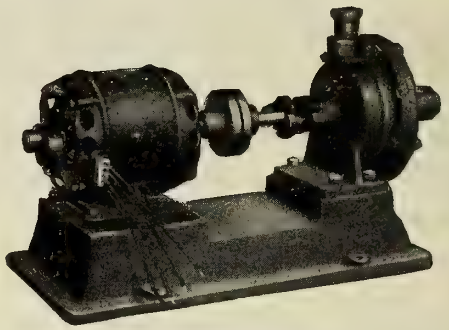

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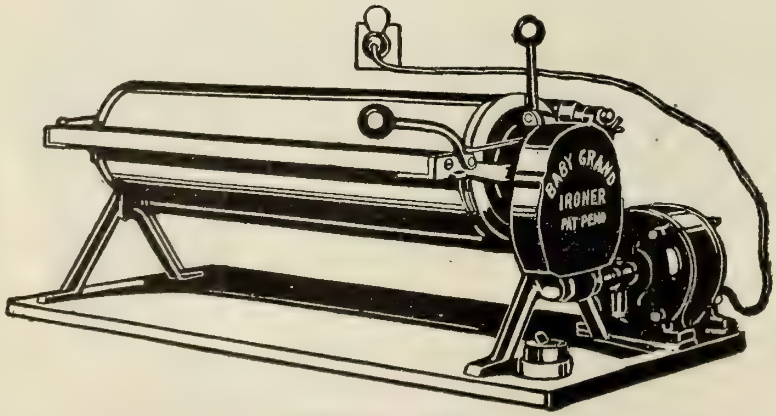

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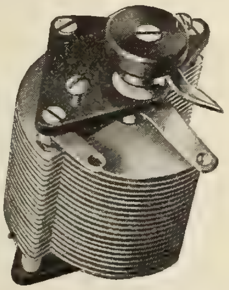

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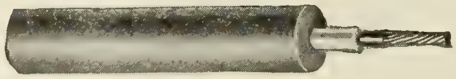

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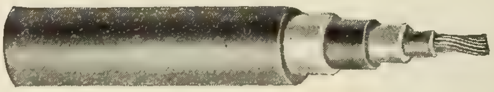

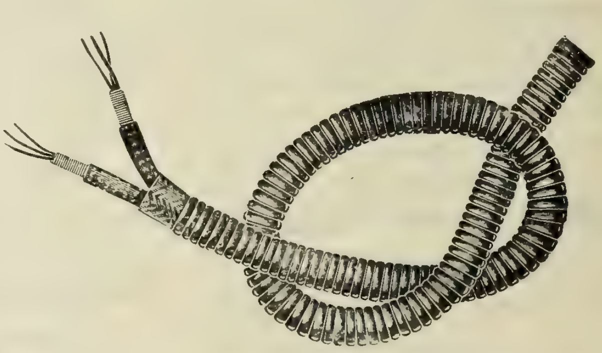

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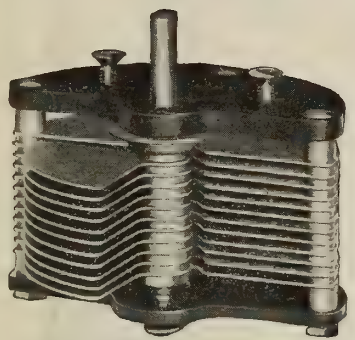

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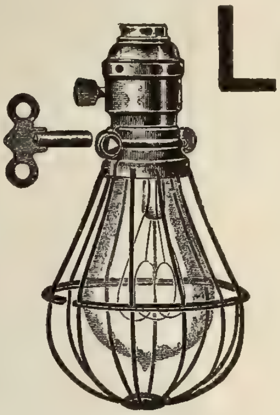

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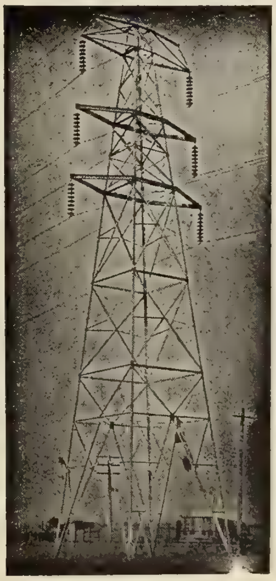


Standard Tower of the Hydro Electric Power Commission of Ontario

The modern means of supporting overhead wires.

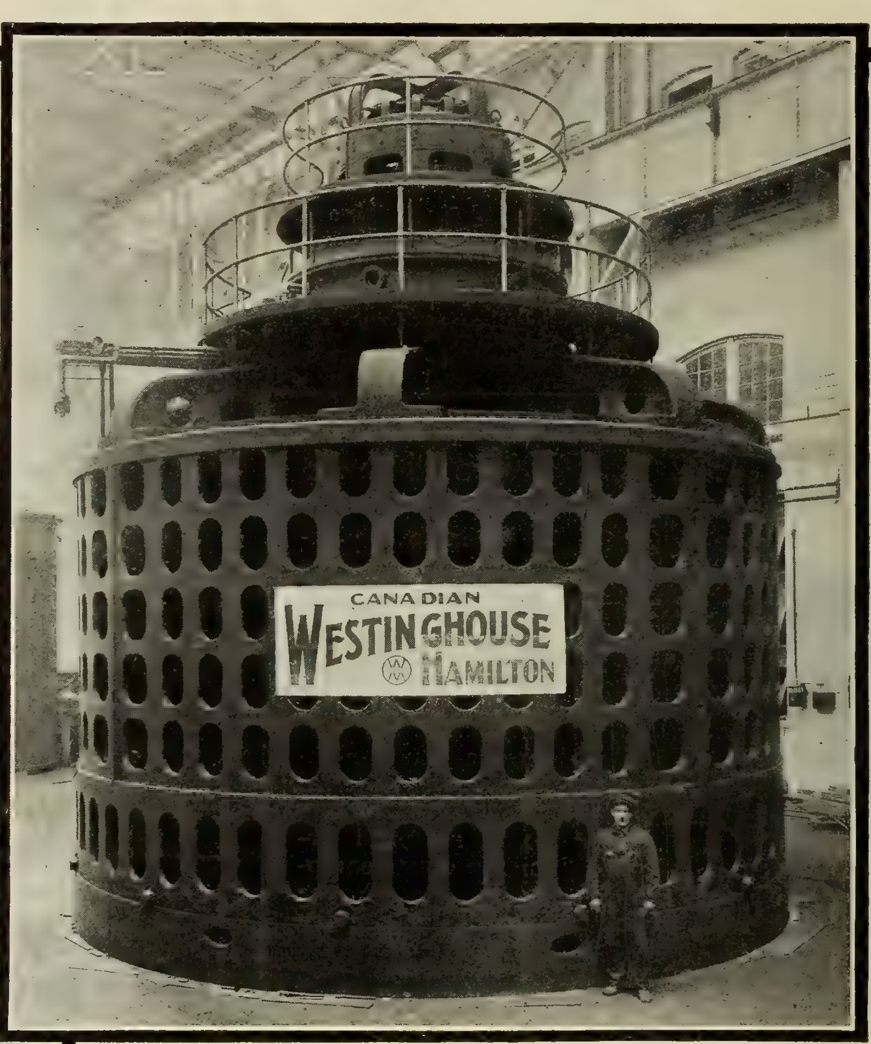
Power
Telephone
and
Trolley
Lines

We shall be pleased to furnish designs and estimates upon request.

The Canadian Bridge Co., Limited
Walkerville, Ontario, Canada
Structural Steel of all Kinds
Montreal Office in New Birks Building.

Westinghouse Queenston Generators

One of the 45,000 Kv-a Westinghouse Generators for Queenston.



View of a Westinghouse 45,000 Kv-a. generator under construction.

Three of the five giant generators built for the Queenston Power Project are Westinghouse Units.

Each has a capacity of 45,000 Kv-a.

These generators represent a remarkable feat in electrical engineering, as they are of greater capacity than any generators built previous to this power project.

Canadian Westinghouse Co., Limited, Hamilton, Ont.

TORONTO, Bank of Hamilton Bldg.
HALIFAX, 105 Hollis St.
CALGARY, Canada Life Bldg.
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FT. WILLIAM, Cuthbertson Block
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OTTAWA, Ahearn & Soper, Ltd.
WINNIPEG, 158 Portage Ave. E.
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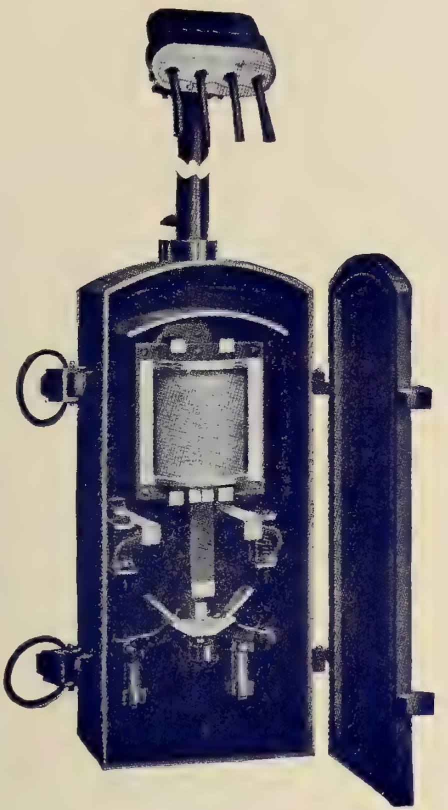
TORONTO—366 Adelaide St. W.
VANCOUVER
1090 Mainland St.
WINNIPEG—158 Portage Ave. E.
CALGARY—316 3rd. Ave. E.

CANADIAN WESTINGHOUSE



Cap. 30 Amp

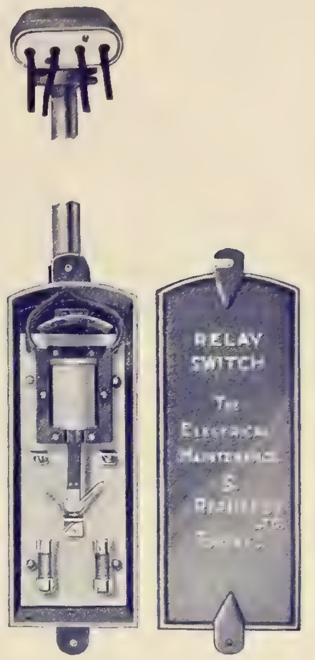
Engineers, Take Notice!

A new, smaller, simplified Remote Control Switch.

A young friend of our 30 Amp Switch—to do the many small jobs where the big fellow is too expensive.

Cheaper, yet perfectly dependable. Has been tested equal to five years' service.

For Street Lighting Control. Write about this.



Cap. 15 Amp

The Electrical Maintenance & Repairs
Company, Limited
162 Adelaide Street West Toronto

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GALVANIZED

Approved by the Hydro-Electric Commission of Ontario
Labelled under supervision of Underwriters' Laboratories

Made in Canada
Conduit

Electrical Wiring
Made Safe

For All
Electrical
Installations

Manufactured by
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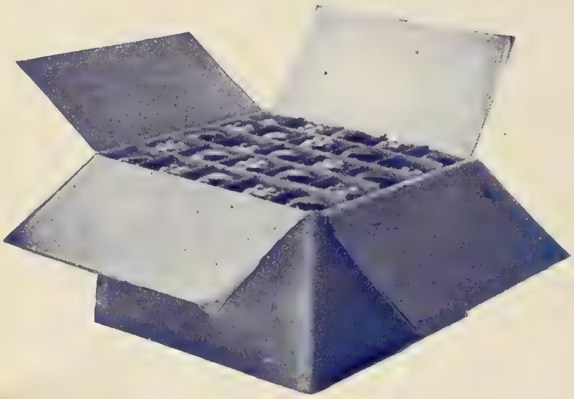
Toronto

Sales Agents for Manitoba and Saskatchewan—Filer-Smith Machinery Co., Limited, Winnipeg.

White's Porcelain Strain Insulators



STANDARD CARTON

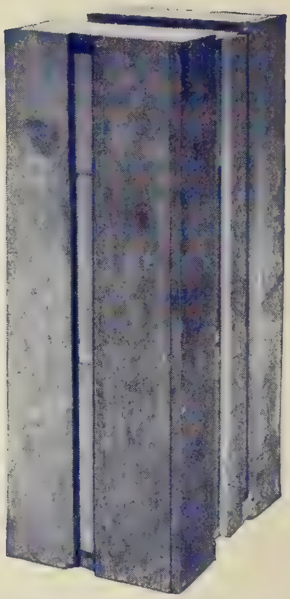
We are now packing our insulators in cartons.

No mussy sawdust.

No breaking.

Easily counted.

Easier handled and stocked.



STANDARD PACKAGE

Try some of our insulators—They all have a very uniform brown glaze, a very distinctive color, no black spots or discoloration.

T. C. WHITE ELECTRICAL SUPPLY COMPANY

1122 PINE STREET, ST. LOUIS, MO.

National ELECTRIC

Ranges, Water Heaters and Hot Plates

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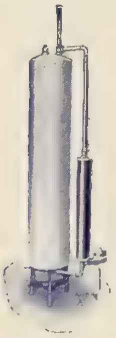
C-6 Range

A-4 Range

Show these Appliances in your Store and be prepared to meet the demand



Water Heater

Two Burner Hot Plate

The National Electric Heating Co., Limited, Toronto

MONTREAL
49 Mountain Street

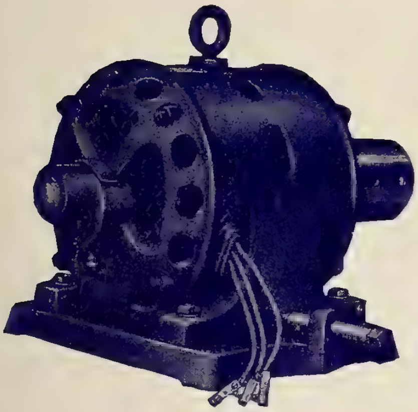
WINNIPEG
52 Albert Street

VANCOUVER, B.C.
1001 Standard Bank Bldg.

Vol. XXXI No. 17 Toronto, September 1, 1922

Electrical News

Engineering Contracting Merchandising Transportation



Century

Ratings ½ to 60 H.P.

Automatic Start Polyphase Motors will be found particularly desirable wherever called upon to develop a high static torque with a definitely limited starting current, or where fuse protection is necessary and where remote or automatic control is desirable.

Send for Bulletin No. 28

AUTOMATIC START INDUCTION
POLYPHASE MOTORS

CENTURY ELECTRIC COMPANY ST. LOUIS, Mo., U. S. A.

Alphabetical Index to Advertisers, Page 10 **Classified Directory to Advertisements, Page 68**

For Better Illumination

Correct illumination in one of the Dominion Rubber System's Workrooms.

Correct illumination in E. G. Gooderham & Company's Automobile Showrooms, Toronto.

These Installations solved two problems of Correct Lighting

Your territory teems with unsolved lighting problems. Many factories, offices, stores, hotels, churches, theatres and other public buildings are poorly illuminated. New buildings are constantly being erected. Every lighting prospect has its own peculiarities, to meet which a variety of fixtures are designed. It becomes a question of correct application. Let our illumination specialists assist you in deciding the form of lighting best adapted to your clients' needs.

Write our nearest house

Northern Electric Company
LIMITED

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HALIFAX HAMILTON WINNIPEG EDMONTON
QUEBEC LONDON REGINA VANCOUVER

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- Automatic Telephones
- Wires & Cables
- Fire Alarm Systems
- Radio Sending and receiving Equipment

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- Construction Material
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of England

Manufacturing Electrical and General Engineers

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London Office:
37 Norfolk Street, Strand, W.C. 2

The Canadian demand for Switching Equipment and Switchboards of the Ferguson, Pailin Limited standard, has prompted us to enlarge our scope for service and open an office and warehouse at Toronto. Our representative there will be available to demonstrate and furnish full information relating to all our products; also to discuss the application of standard equipment and the design of new equipment to meet special requirements.

Our line includes:

Heavy and Light Duty Oil Circuit Breakers, all voltages.

Interlocked and Non-Interlocked, Safety-First, Factory Assembled, Steel-Enclosed Switchboards.

Iron Clad, Safety-First, Industrial type Switchboards.

Vertical and Desk type A.C. Switchboards.

Vertical D.C. Switchboards.

Light and Heavy Duty Bus-bar Supports, Choke Coils and Disconnecting Switches for both Indoor and Outdoor Service.

Knife Switches, Fuses, etc.

Canadian Office and Warehouse

321 King St. East - - TORONTO, ONT.

HERMAN K. ANSINGH, Canadian Representative

Formerly Design Engineer with the Westinghouse
Electric and Manufacturing Co., Pittsburgh, Pa.

Packard

Transformer Temperature Signal

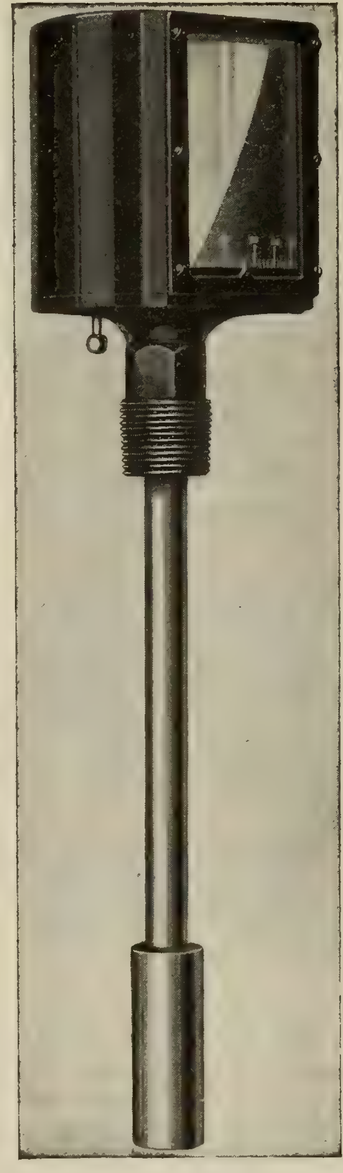
For Every Service Type Transformer

A Maximum Demand Heat Meter

All station Transformers, Circuit Breakers and all Machinery that is liable to reach a dangerous temperature by overload or any other condition should be equipped with one.

Canadian and U. S. Patents Pending

See Our Nearest Representative



White Signal Shows Dangerous Temperature

Can be seen and read from the street or from the floor when used on large apparatus.

Simple, durable and easily installed.

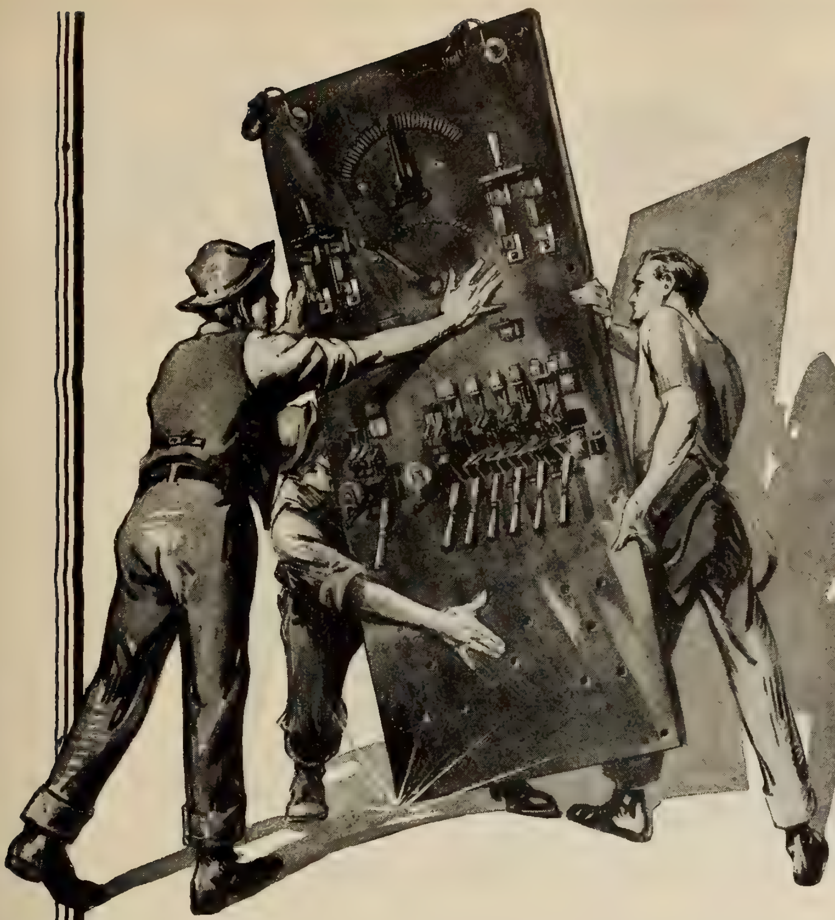
Others may follow but we lead

The Packard Electric Co., Limited

St. Catharines, Ontario

Room 308-9, 7 Adelaide St. W., Toronto **421 Power Building, Montreal**
703 Confederation Life Building, Winnipeg

Agents:
Eastern Electric Co., Limited, St. John, N.B. J. T. Warren, 738-11th St. West, Calgary, Alta.
W H. Hazlitt & Co., Ltd., Room 401 Northwest Bldg., Vancouver, B. C.
John Starr, Son & Co., Limited, Halifax, N.S.



The lightest insulating base is the strongest

HERE is a switchboard material that combines the qualities of lightness and strength. Johns-Manville Ebony Asbestos Wood has a higher mechanical strength than soapstone, slate, or marble; yet with two-thirds their weight.

Stronger electrically, too

Ebony Asbestos Wood has a higher electrical insulation and puncture resistance than any of these quarried materials, even when they are without flaws—which is not often the case.

Manufactured by formula, Ebony Asbestos Wood is not subject to flaws, cracks, or metallic veins. Every piece is a solid homogeneous block of cemented asbestos fibre, impregnated with a highly efficient dielectric compound.

Best for all uses

The result is an insulating base comparable to mica or hard rubber in efficiency. Yet it is rigid, strong, permanent and can be readily worked. High quality demands Ebony Asbestos Wood for all severe requirements —low price justifies it for ordinary use. Send for a booklet.

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Windsor, Ottawa.

JOHNS-MANVILLE SERVICE
COVERS THE CONTINENT
Through
ASBESTOS
and its allied products
Electrical Materials
Brake Linings
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Roofings
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Cements
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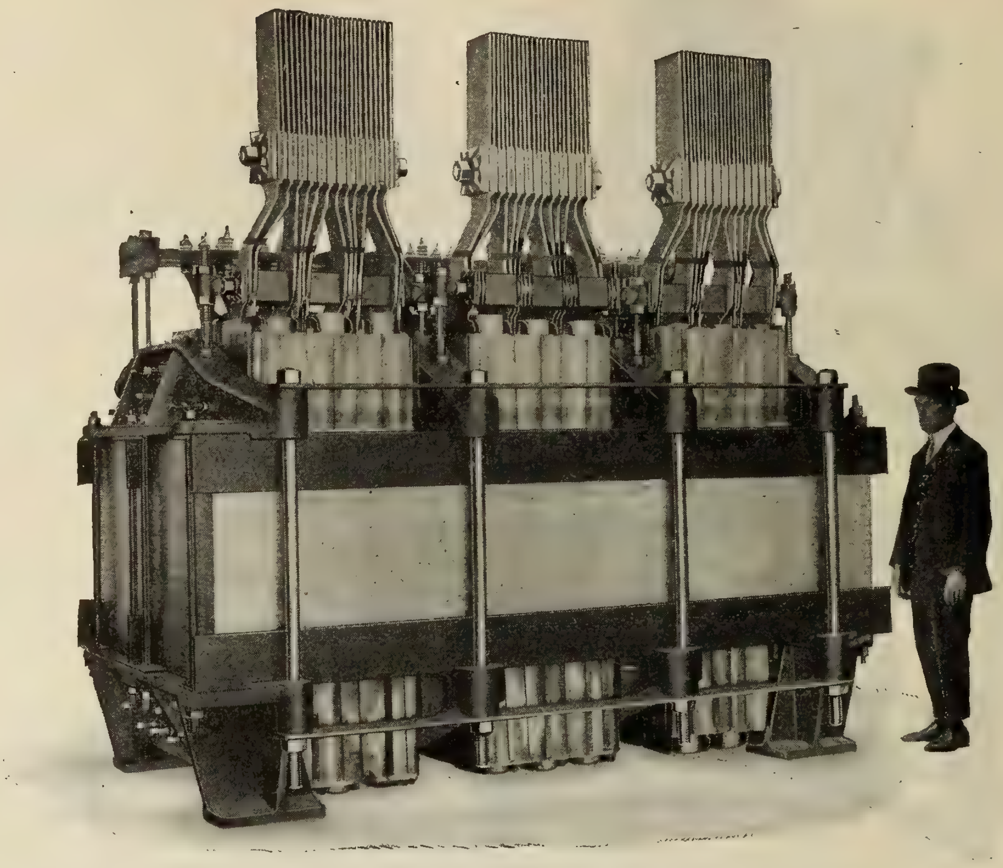
JOHNS-MANVILLE
Ebony Asbestos Wood



4500 K.V.A. 45700 - 26400 - 13200 volts to 90-100-110-120-130 volts, 25 cycles, 3 phase Water Cooled Transformers

Heavy Duty Transformers

Canadian Crocker-Wheeler Engineers give outstanding service in the designing of Transformers for all classes of duty. In the Electric Furnace Work Transformer illustrated above, note the heavy solid construction of the low tension coils and leads, and the rugged bracing of the windings. Transformers of this type built by us have been continuously overloaded for years on end without impairment.

THE CANADIAN
CROCKER-WHEELER CO.
LIMITED

Manufacturers and Electrical Engineers

Head Office and Works:
ST. CATHARINES, Ont.

District Offices:
TORONTO MONTREAL

Also all
Branches of

Northern Electric Company
LIMITED

Montreal, Halifax, Ottawa,
Toronto, London, Winnipeg,
Regina, Calgary, Vancouver.

Diamond-F

Fish Paper

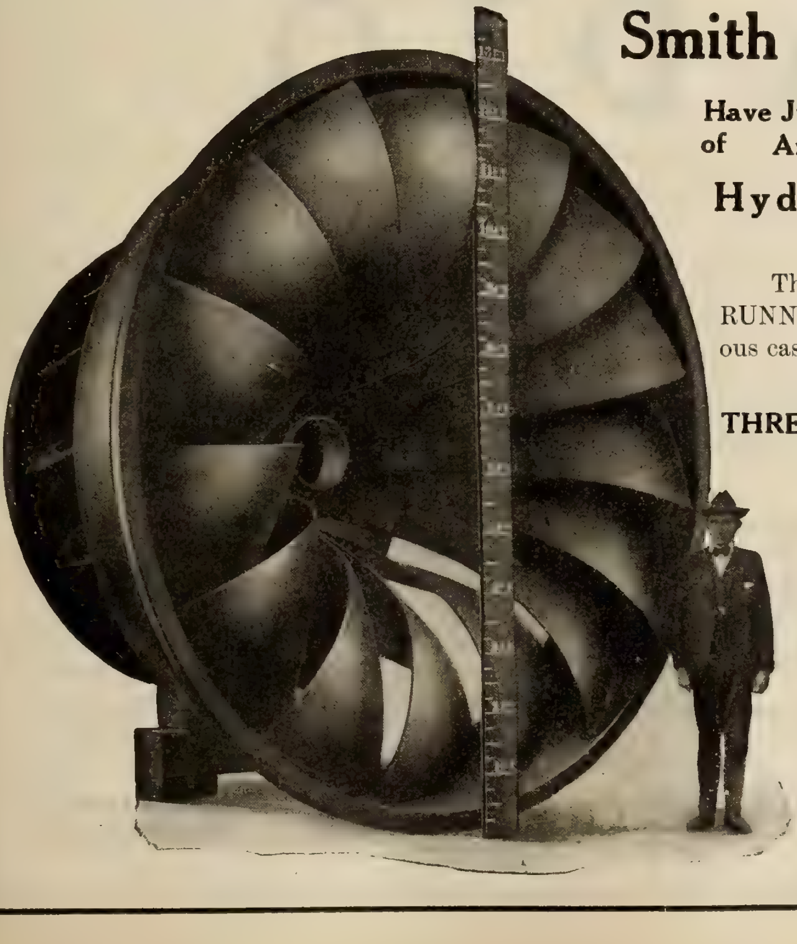
For the insulation of armatures and field coils "Diamond Insulation" has been found to possess qualities which make it distinctly valuable for all such work where a thin insulation of high dielectric strength is required.

The flexibility of this material permits of its being bent and formed without danger of cracking and its ability to withstand extreme compression gives it a distinct superiority over other similar materials.

We shall be glad to submit samples for testing upon request.

Diamond Fibre in sheets, rods and tubes for general insulating requirements. Condensite Celoron for waterproof insulation and noisless gears.

Diamond State Fibre Company
of Canada Limited
Head Office and Works: 235 Carlaw Ave., Toronto, Can.



Smith Hydraulic Turbines

Have Justified Their Installation in many of America's Biggest and Best

Hydro Electric Developments

The accompanying view illustrates a SMITH RUNNER, 13 feet diameter, made in one continuous casting by means of dry sand cores.

THREE TURBINE UNITS (of which these runners comprise the rotating element) furnished for installation in the Yadkin Falls, N. C., plant of the Aluminum Co. of America. Each unit develops 10,000 H.P. at 90 R.P.M. under 48 feet head, using water at 92 per cent efficiency.

Write Dept. "N" for Bulletin.

S. MORGAN SMITH CO.
YORK, Pa., U.S.A.
H. B. VANEVERY, Representative
405 Power Building Montreal

Announcement

EXTRAORDINARY

An Electric Heater to Retail $7.50

Gilbert Polar Cub Electric Heater $7.50

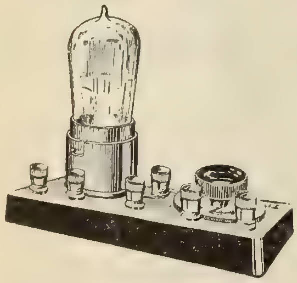
Specification

Solid copper reflector 11″ diameter, beautifully burnished cast iron hase weight 2½ lbs., dia. 7″, fluted design. Base and back of reflector finished in indestructible black enamel—adjustable reflector. Filament equal to any on the market. 600 watts, 110 volts A C or D C. Equipped with 7 feet standard underwriters approved cord and two piece separable attachment plug.

We will soon be sold up—Act now

The A. C. Gilbert - Menzies Co., Limited 439 King St. W. TORONTO

RADIO



4079 Vac. Tube Detector without Bulb, $7.50 retail

Mr. Dealer:

You can sell your stock of Mineral sets by pushing the sale of our V. T. Detector. Moreover, thousands of amateurs have mineral sets that they want to convert to 100 mile range sets. This will do it—get tests at our salesroom.

SEND FOR NEW GILBERT CATALOG

illustrating—New Radio frequency set, range 1000 miles—4019 set, range with added 2 stages, 500 miles—Premium Vac. Tube set in Cabinet—New Amplifiers—Condensers—Vario-meters—Vario-couplers — Head-phones — Loud Speakers—Amplifying Transformers—R.F. Transformers, Sockets, Etc.

The A. C. Gilbert - Menzies Co., Limited 439 King Street W. TORONTO

Canada Wire & Cable Co. Limited

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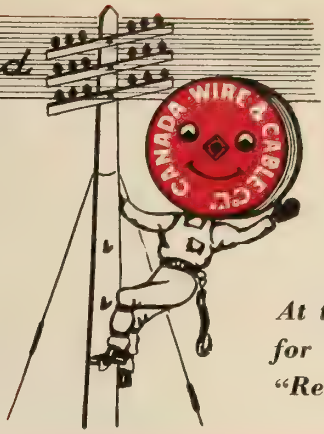
Winnipeg Calgary Vancouver

Electric Wires and Cables

Copper
Bare, Weatherproof, Rubber Covered

Steel Wire Rope


CANADA WIRE & CABLE CO.

At the top
for
"Reel Service"

CANADIAN PORCELAIN CO.
LIMITED

HAMILTON - CANADA

Manufacturers of High and Low Tension Porcelain Insulators

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COLD MOLDED INSULATION
BAKELITE - CONDENSITE - ROXITE
SHELLAC COMPOSITIONS

We have a capable engineering force ready to take up your molded insulation problems.

Suggestions and estimates cheerfully given without obligation.

AMERICAN INSULATOR CORPORATION
New Freedom, Pa., U. S. A.

Represented in Canada by
G. L. MacGILLIVRAY & CO., LIMITED
35 St. Nicholas St., Mntreal, P.Q.

AMPLIFY YOUR RADIO SIGNALS WITH

SUPER-SENSITIVE
Detectagraph
MICROPHONE DEVICES

Practical Instruments for Commercial & Scientific Purposes

Super-Sensitive Detectagraph Transmitter No. 2, Price $8.00 complete.

Adjusted Model No. 60 Horn, High Grade Loud Talking Receiver, Cord Plugs and Desk Stand Base, Price $15.00 complete.

Our New Special Loud Talking Receiver No. 25, Price $7.50.

Detectagraph Rheostat, especially made for amplifying circuits, Price $2.00 complete.

Write for our free descriptive new catalogue showing our complete Super-Sensitive Hearing and Talking Devices.

C. BOISSONNAULT COMPANY (Inc)
25 Church St. Factory: Whitestone, L. I. New York City

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FOR POWER, LIGHT AND TELEPHONE WORK

Incandescent Lamp Cord, Flexible Switchboard Cables, Special Cords and Cables for all kinds of Electrical Work.

Prompt Shipments from Canadian Factory.

BOSTON INSULATED WIRE & CABLE CO., Limited

Canadian Office and Factory, HAMILTON, ONT.

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LORICATED

A Galvaduct Building
Barber-Ellis Building, Toronto

"GALVADUCT"

The most perfect interior construction conduit on the market. Recognized as the standard of high quality.

Always specify Galvaduct or Loricated CONDUITS

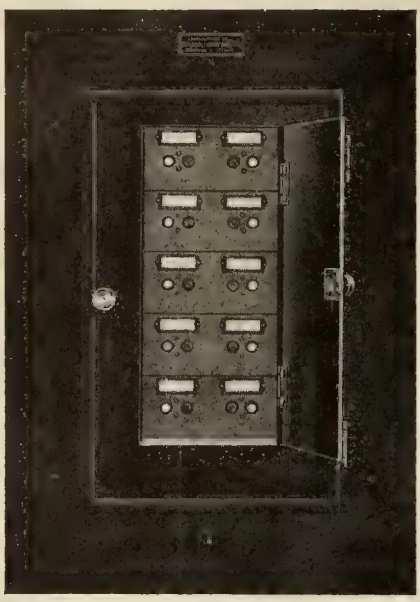
"LORICATED"

A high-class interior construction conduit of the enameled type, proof against acid or other corrosive agents.

If your jobber cannot supply you—write us.

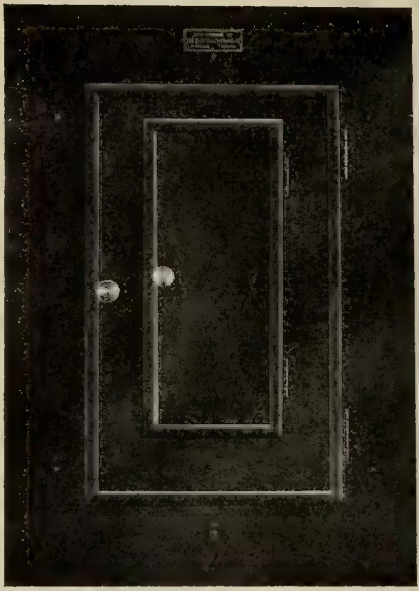
CONDUITS COMPANY LIMITED
TORONTO MONTREAL
Western Sales Office: 602 Avenue Building, Winnipeg

DEVOE - LATEST - SAFETY - PANELS



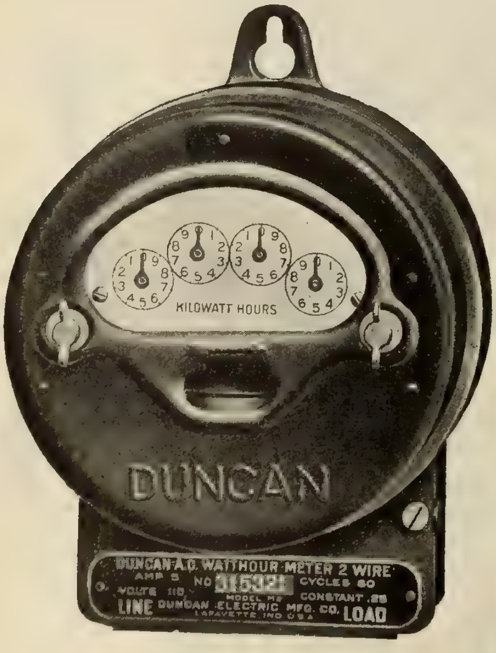
Our new catalogue, No. 10, describing the above panels, will be ready shortly for distribution.

Send us your specifications and we will quote you prices.



The Devoe Electric Switch Company

414 Notre Dame West, Montreal, and 105 Victoria St., Toronto, Ont.



DUNCAN

Model M 2

IS A

TIME SAVER

THEREFORE

A

MONEY SAVER

Bulletin 110

THE GEORGE C. ROUGH SALES CORP'N.

134 CORISTINE BLD'G.
MONTREAL

Sustained Meter Accuracy Depends on Pivots and Jewels

THE excellent quality of pivots and jewels is one of the factors responsible for the sustained accuracy of Sangamo Type "H" alternating current watthour meter.

Performance in service is the real test of a meter bearing. "The proof of a pudding is in the eating thereof," and an abundance of evidence covering years of service has demonstrated the excellent wearing qualities of Sangamo pivots and jewels. Numerous service tests have shown that after many million revolutions of the meter disc neither the jewel nor pivot show the slightest wear.

THE PIVOT DUST GUARD shown in the illustration provides a practically dust-proof protection for the jewel bearing. Since it is mounted on the pivot and projects downward, completely enclosing the jewel and pivot, dust and particles are shed away from the jewel, not into it.

The pivot guard at the same time serves as a protection for the polished surface of the pivot and prevents it from being touched in handling when removed from the meter for inspection.

SANGAMO

There are many other reasons why the Sangamo meter has so many friends. Let us tell the whole story. Send today for Bulletin No. 55-C describing Type H alternating current watthour meters.

Sangamo Electric Company
of Canada, Limited

Factory: TORONTO **Head Sales Office: MONTREAL**

Made in CANADA Products

A complete line from one manufacturer

We have begun shipping to Jobbers stocks, Surface Snap Switches. Made—not merely assembled—in Canada. At present this line embraces 3 to 10 ampere sizes in either Brass or Composition Cover. Your Jobber has them.

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Vancouver Winnipeg

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MANUFACTURERS OF FLEXIBLE CONDUIT AND KRAFT PAPER CORD

LOOMDUCT

A Single Wall Conduit of Unusual Flexibility.

Every coil of "Loomduct" and "Insuladuct" is fished at the factory and guaranteed against defects of every kind.

INSULADUCT

A Double Wall Conduit of Great Strength and Durability.

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Loomduct
REGISTERED

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TRADE MARK
Insuladuct
REGISTERED

THE FOLLOWING SIZES ALWAYS IN STOCK:—¼" ⅜" ½" ⅝" ¾" 1"

We are manufacturers, in a large way, of

TOP PINS, SIDE BRACKETS, POLE STEPS AND CROSS ARMS

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Our goods are specified where efficiency and economy are measured by actual results and not by purchase price only.

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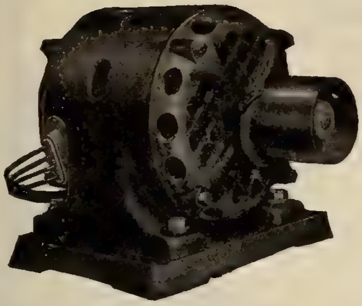
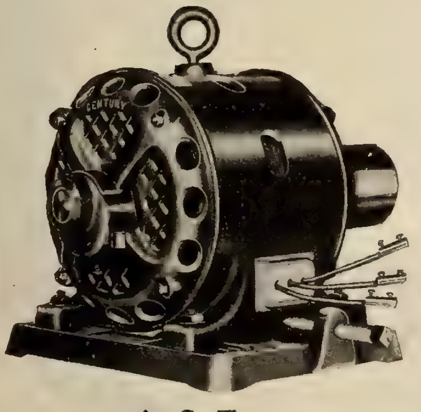


R. S. Type



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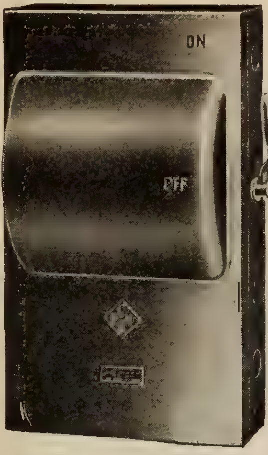

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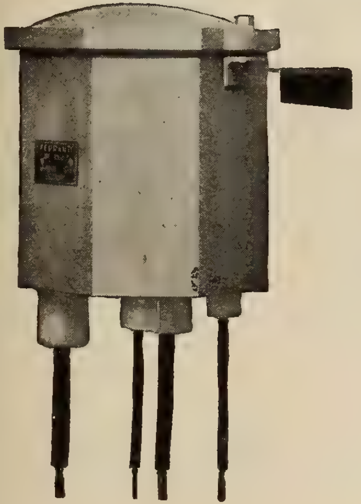

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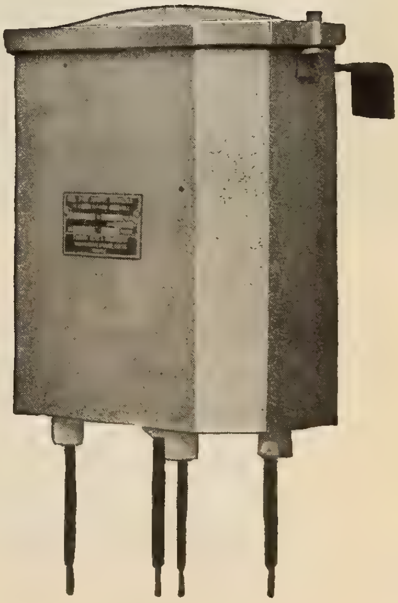

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The demand for this wonderful little device will, in all probability, exceed the supply. We strongly urge all Electrical Dealers, who are merchandising radio equipment, to place their orders with our nearest sales branch immediately.

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"Turns the Toast Without Handling"

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The new Hotpoint reversible Toaster retains the sterling qualities of all Hotpoint appliances, and adds the new reversible feature. The bread is turned over without handling, kept hot and toasted evenly. Supplied with a Hotpoint interchangeable cord and plug.

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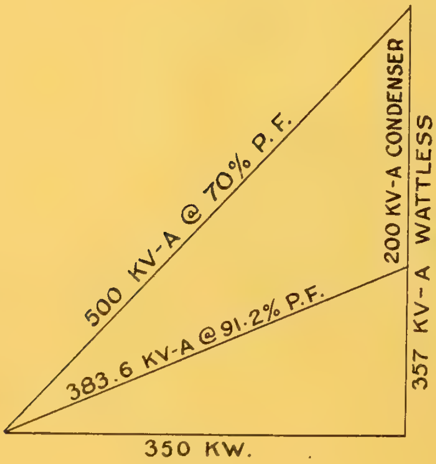
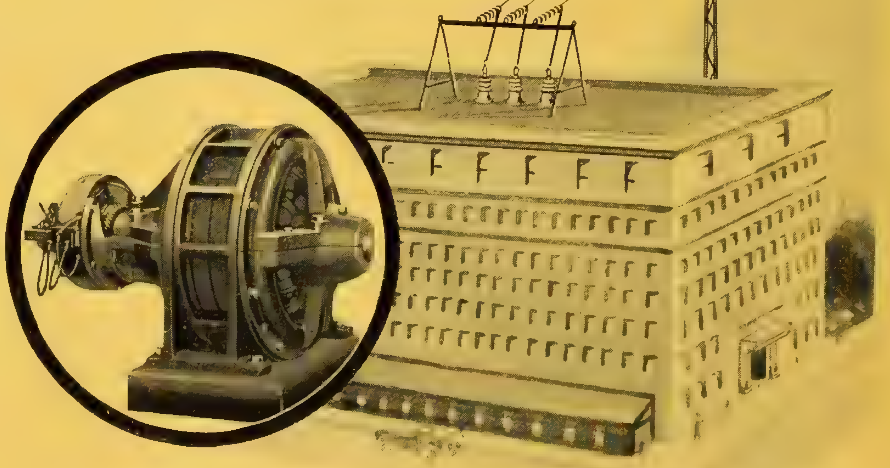
The installation of a C.G.E. Synchronous Condenser of 200 Kv-a. capacity would, as shown in the diagram below, bring the power factor up to above 91%, that is, above the penalty point, would reduce the power bill by the amount of the penalty and in addition improve the voltage regulation and the factory lighting. Any consumer penalized for low power factor may obtain reliable engineering information and data on matters of this nature by referring to our nearest sales branch.





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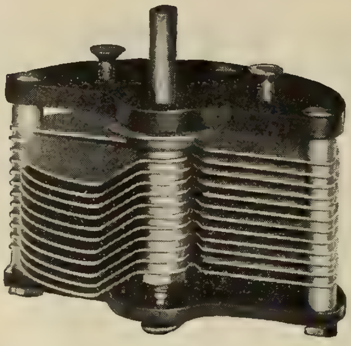

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without dial or knob.

Liberal discounts to jobbers and dealers.
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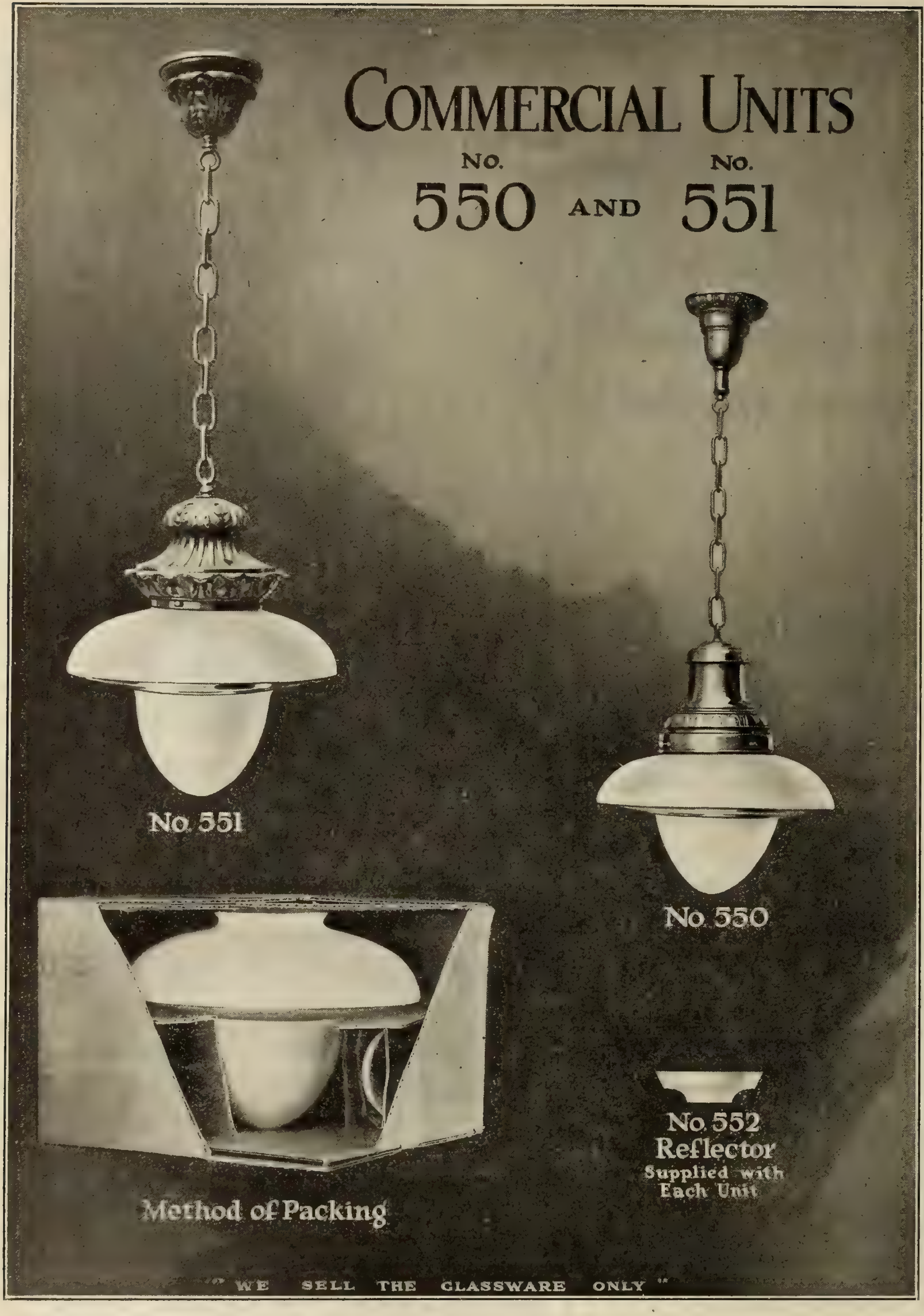

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BRAVE as the Marines are the men who keep the switchboards, substations and transmission of America's high power lines in operation and free from trouble.

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All material passes special high tension test. Tongues centered and offset to equalize stresses. Metal parts cemented to porcelain. No low temperature flowing metals. Interchangeable mounting base-pipe or flat—adjustable for any bus position.

Indoor Disconnecting Switches

Hinge and contact specially ground-in for perfect contact surface. All double blade construction.

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Outdoor Disconnecting Switches

All truss-type blades. Soft brass head clamps shaping to insulator head, non-crushing. 45-degree switches equipped with heavy H section pins. Upright and inverted switches with X section pins. Special direct-acting patented latch for outdoor lock. No spiral springs. No hinges. Non-rusting. All outdoor apparatus mounted on hot-dipped galvanized channel iron sections. All outdoor steel equipment hot-dipped galvanized.

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All 25,000 volt service and over fitted with longitudinal braces. No distortion under short circuit.

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High grade copper castings micrometer machined for shrink fit.

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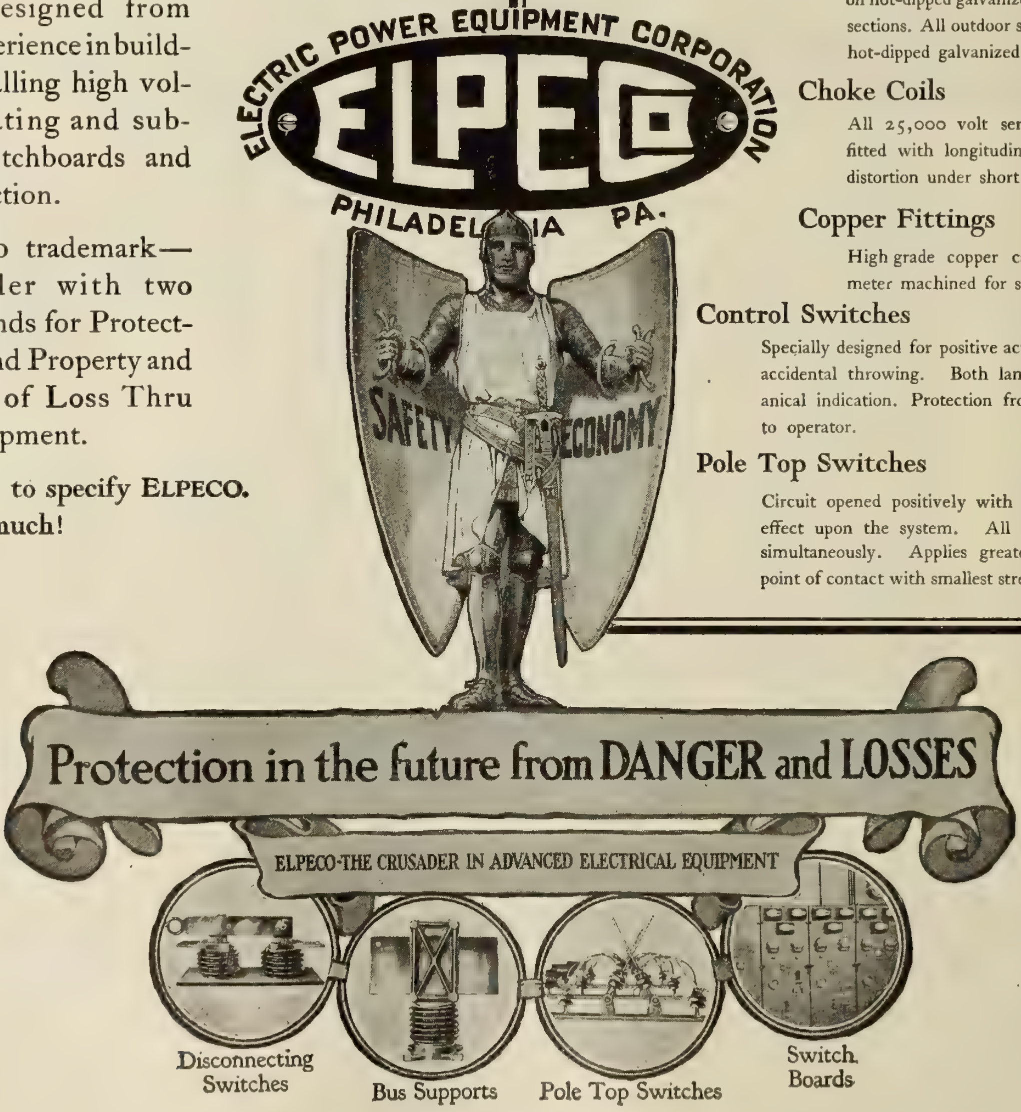
Circuit opened positively with no destructive effect upon the system. All phases broken simultaneously. Applies greatest pressure at point of contact with smallest stress at insulator.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Generation, Transmission and Application of Electricity

For nearly thirty years the recognized journal for the Electrical Interests of Canada.

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Vol. 31 *Toronto, September 1, 1922* *No. 17*

Coal Shortage Offers Electrical Industry Opportunity to Demonstrate its Value

The coal situation, which is particularly acute in Central Canada, is destined to give electricity, and electrical men, this autumn, an opportunity to demonstrate their value to the community in a time of emergency. We drew attention in our last issue to the fact that at the Queenston-Chippawa development alone, there would be available some 150,000 h.p. of electric energy owing to the fact that this plant will have five units installed to meet an industrial demand that has not developed as rapidly as might naturally have been expected. It may well be that this amount of energy, available in the Province of Ontario, may prove a regular God-send during the coming winter as an auxiliary to a probably limited coal supply.

It is generally recognized, of course, that electric energy developed from our waterfalls can never be depended upon to take care of anything more than a small fraction of our heating load. Electric energy is more usefully employed in the form of power and light. For the present, however, we must make the most of a very bad job, and if the electrical men ever had an unusual opportunity to demonstrate that the product they make, and sell, is one that can come to the aid of the citizens in their greatest need—right now is the moment.

Quite aside, however, from the benefits to be derived by the general public are the financial profits that can accrue to the industry itself. The situation represents a possible demand for perhaps two or three hundred thousand heaters of various kinds, along with which electric ranges will naturally be associated. In actual effect too, this will represent but a small part of the new business available. Only a very limited number of homes are sufficiently well wired to connect up electric heaters or ranges, and so, as the second step in the development, we have an opportunity for the sale of many thousands of installations of wiring equipment, if our contractors will only view the situation in a business like way.

It would be well in some ways if the demand stopped here and involved only contractors and dealers. However, the central station is immediately concerned, for many of its lines are already loaded to capacity. The addition of heaters will mean more copper and more transformer capacity, which in turn will benefit the manufacturers of these products.

It is thus very evident that the electrical industry not only has a wonderful opportunity for helping the citizens, but an equal opportunity of benefitting itself. Let us ask ourselves the questions,—"Are we moving fast enough?" "Are we making the necessary plans to take advantage of the profits that will offer during the next two or three months?" If we delay, our chance is lost for a year at least.

Indirectly, there is another factor to be considered, viz. the moral effect on the citizens, if electricity demonstrates its value at this critical time. Electricity is still looked upon by many as a luxury. Here is the opportunity to show that it is a necessary utility,—that it can be one of the biggest factors in maintaining the smooth running course of our industrial and social life. If we take the fullest advantage of our present opportunities we shall go a very long way towards establishing electricity in the minds of the general public as a necessary part of their regular existence.

Intensive House-to-House Selling Does Produce Results

An article in the July 15th., issue of the "Electrical News" entitled "House to House Appliance Selling," has raised some criticism on the score that it was giving encouragement to undesirables—the peddler class.

The argument may be well taken, but it is worth noting that this article was written by a member of one of the largest Central Station Companies on the continent and one of the most vigorous in merchandising electrical equipment. Careful reading of the article indicates also that the class of salesman who is making a success of this work is well trained and well educated in the merits of his goods. Indeed reading between the lines of the article we would judge that these men are a quite superior type, and entirely such as the average electrical dealer would consider a credit to the industry.

Nor can we overlook the fact that the experience of this large company is a valuable criterion of the possibilities underlying house-to-house canvassing and Mr. Hogue says: "This class of merchandising can only be sold in large quantities by this door-to-door canvass." Might it not be that Canadian dealers would do well to follow the same plan? Don't let us condemn a tried policy until we prove it inapplicable in our own case. Suppose our electrical dealers put their dignity in their pockets for the time being, and give it a try out. Our guess is that they will find it requires all the ability, knowledge, tact and ingenuity they can muster, but, we believe at the same time, that there is no other way to obtain as satisafctory results.

It has been tried in Canada, too—with splendid success. In the near future we shall have an interesting story to tell you about it.

Murray Report on Ontario Hydro and Sir Adam's Reply

United States' Engineer Makes Adverse Report on Ontario Hydro Operations—Reply, Just Issued, Says Murray Statements at Absolute Variance with Well Known Facts

Some time ago the National Electric Light Association engaged Mr. W. S. Murray of the consulting engineering firm Messrs. Murray and Flood, New York, to make a report of Government Owned and Controlled, as compared with Privately Owned and Regulated Electric Utilities in Canada, and the United States. Mr. Murray's report covers a very wide range and occupies some 225 printed pages including a number of illustrations. We have delayed making mention of this report because it was announced immediately by Sir Adam Beck, chairman of the Hydro-electric Power Commission of Ontario, that an answer would be prepared forthwith and we believed that a brief review of both report and answer in the same issue would have the greatest value for our readers. On account of the voluminous nature of both these publications it is impossible to do more than summarise the most important arguments presented. A quantity of valuable information is given in both reports and to obtain an accurate determination of the status of the whole discussion it would be necessary that our readers should digest the printed reports as published in full by the National Electric Light Association on the one hand and the Hydro-electric Power Commission of Ontario on the other. The salient points are, however, presented, we believe, in the following resume:

Since the municipally controlled operations in Ontario are on a much larger scale than anything of a similar nature anywhere else on the continent Mr. Murray's report deals chiefly with the Ontario System. Briefly it may be said that his conclusions are exceedingly unfavorable and he strongly urges that no such scheme of operation should be tried in the United States, because, to use his own words, "What has been done in Canada could never have been done in the United States." This, at first sight, would almost seem like a recommendation for the Ontario System, intimating that the good results achieved in Canada could not be achieved in the United States. However, Mr. Murray's conclusions, given below, do not bear out this interpretation.

In Mr. Murray's report under the heading "Summary Report" he outlines the origin of the hydro movement, its growth, the history of power development, power of the Hydro Commission, the attitude of the people, question of taxes, the cost and capacity of the Queenston and Chippawa development, Nipigon development, question of rates, comparison of costs in Ontario with other localities, and so on.

Statements Re Power Costs

Regarding power costs, for example, the report states that, "the average cost of power to these people of Quebec is 32 per cent. less per kw.h. generated than the cost to all the people receiving Hydro-electric power in the province of Ontario, while it is 27 per cent. less than to the consumers of the Canadian Niagara district, whether they are served by government or privately owned electric utilities.

"The private companies in Quebec deliver 84 per cent. more energy per capita than does the Hydro-electric Power Commission to its customers in Ontario, while the generating capacity available per 1,000 population is greater by 89 per cent. than those available upon the lines of the Hydro-electric Power Commission of Ontario."

Comparing the cities of Toronto and Montreal as to average cost of power the report goes on to say. "The average cost of power to customers of Montreal was 1.13 cents per kw.h. for 1920. At the same period the average cost of power delivered to the customers of the Toronto Hydro-electric System was 1.47 cents per kw.h.—29 per cent. greater than that of Montreal.

Mention is also made of the cost of street lighting, and here again it is claimed that the cost of street lighting in Montreal is about 47 cents per capita, while it is about 67 cents per capita in Toronto.

Reference is also made to the un-uniform power costs in Ontario, Mr. Murray reporting that the system of rates making in Ontario is "fundamentally wrong."

Referring to the cost of the Queenston Chippawa development, Mr. Murray argues that the present permissable diversion of water on the Canadian side will only allow an effective capacity, including the Ontario Power Co. recently purchased, of 351,500 h.p., or with one unit in reserve 406,500 h.p. "Upon the basis of the above figures the total investment per installed h.p., without reserve would be $252., while the investment per h.p. with the reserve capacity, would be $218." Mr. Murray sums up as follows:—

Summary of Conclusions

After a careful analysis of the governmentally-owned, controlled and operated electric utility structure as represented in the Hydro-electric Power Commission of Ontario, I am of the opinion, firstly, that the principles of its application can find no place in the United States; secondly, that to attempt the substitution of its principles of control and operation within the States would be to strike a blow at economic structures, the present existence of which are not only far better equipped to protect the public interests in their conjunctive relation with the public service commissions of the States regulating their rates, but it would also be to strike an equal blow at the shareholders of the electric utilities which are now serving the American public; and, thirdly, that the Hydro-electric Power Commission owes its being only to the fact that a public service commission on the order of those operating in the States was not in existence in the Province of Ontario at the time of its creation.

I support the above statement in the following conclusions:—

(1) Power as applied in Ontario from the governmentally-owned and controlled system in associate relationship with the Hydro-electric Power Commission to be superior in kind to that supplied by the privately-owned electric utilities of the United States must be more adequate, more reliable and cheaper. The facts show, however, that the electric utilities of the States hold more power in reserve and sell more energy per capita served, that by that token they can claim a greater reliability of supply and that the supply is cheaper to the consumer.

(2) At the end of the fiscal year 1920, out of the total power plant capacity operated by the Hydro-electric Power Commission only 23 per cent. of it was constructed by the Hydro-electric Power Commission; the remainder represents plant capacity constructed at the initiative and risk of private investors, and in acquiring ownership of it, such intangibles as franchise rights, good-will and other intangibles were included in the purchase. This intangible cost, therefore, is represented in power "at cost." If a governmental plan of like characteristics to that of the Hydro-electric Power Commission is to be inaugurated in the United States,

it must include the purchase of or the contracting of power from existing utilities and the same problem of including intangibles will be presented here.

(3) The building of new power plant facilities under the auspices of governmental-ownership, as shown in the cases of Nipigon and Chippawa, both in respect to policy and cost, is not to the economic interest of the people.

(4) The advocates of government or municipal ownership of electric utilities claim reduction in the cost of power by virtue of

(a) Elimination of taxes.
(b) Elimination of dividends.
(c) Elimination of high-salaried executives.
(d) More economical wage and higher efficiency in labor scale.

With regard to (a)—taxes are not eliminated. Just as much money in taxes is paid. The difference is in their distribution. In the case of private ownership, only the users of service pay the tax bill, while in the case of government-owned utilities all the people pay the bill.

With regard to (b), (c) and (d), notwithstanding dividends, high-salaried executives and the wage and labor claim, the answer is, when the total operations are summed up, the people receive the power at less cost through private ownership under regulation.

(5) The investment of capital in electric utilities under private interest control is far better protected from extravagance than when that capital is governmentally-owned, for the reason that plans and estimates for such capital expenditures not only must gain the approval of a trained engineering and managerial staff and an experienced board of directors of the companies, but it also must have the critical review of the banker and the private financial investor. In the case of government-owned utilities, the directing heads are seldom specifically trained in the business under their jurisdiction, and value of securities is not based upon the value of the property or the efficiency of management, but upon the taxing power of the government.

Arms, legs and body are useless without the head. A high-salaried executive usually saves many times (his salary included) the losses incurred by the cheaper and less efficient executive. Accomplishment by individuals in control of private enterprise is under keener observation than is the case when those in charge are governmental or municipal officers.

(6) Governmental ownership eliminates all incentive for gain and throttles initiative. This is evidenced by the far greater growth of privately-owned utilities.

(7) The Hydro-electric Power Commission is the judge of its own acts. A commishion cannot fairly be the judge of its own (and others') rights in contentions.

(8) Honesty of purpose does not necessarily reduce the power bill. The structure under which it is administered counts just as much—so far as the price is concerned.

(9) The American companies in the Niagara district are supplemented by steam power far more than those on the Canadian side, and yet on the American side power is being furnished at less cost to the people.

(10) The Commissions of the States fully realize that protection to the people lies in protection to the electric utilities from which they are receiving power. The authority delegated to them to regulate rates, and the constitutionality of the law standing behind any action on their part or on the part of the electrical utilities, provides a structure constructively balanced to do justice to all parties.

(Signed) W. S. MURRAY,
Murray & Flood.

Hydro-Electric Power Commission of Ontario Issues Reply

The Hydro-electric Power Commission of Ontario has just issued its reply under the title "Refutation of Unjust Statements Contained in a Report Published by the National Electric Light Association, entitled Government Owned and Controlled Compared with Privately Owned and Regulated Electric Utilities' in Canada and the United States." It contains 50 odd pages, with a Foreword over the signature of Sir Adam Beck. This Foreword touches upon the items that are covered in greater detail in the report. It states that the Hydro-electric Power Commission had given Mr. Murray information "unstintingly," which Mr. Murray had used in his report, but that the corresponding information respecting the private electric utilities was not forthcoming, as Mr. Murray claimed that this was given to him in "confidence," and goes on to say:

"Mr. Murray has made definite statements purporting to be true but which are at absolute variance with well-known facts. He has misquoted statements, even replacing significant words therein with others. He has presented grossly misleading statements respecting even physical facts within his knowledge, and he has made comparison between entities radically different, when even a proper recognition of the real differences would have created an impression entirely at variance with what he has represented. He has inflated costs in a manner which falsifies the conclusions. Such procedure is characteristic of the use made of much of the essential material embodied in the premises which Mr. Murray has adduced and upon which he has based his conclusions. This accounts for the worthless nature of such conclusions."

Street Lighting in Toronto and Buffalo

The report proper deals with the substantiation of this retort. All Mr. Murray's arguments and charges are not answered, typical items only being considered. An example is the relative cost of street lighting in Buffalo and Toronto. Mr. Murray's report had stated that the Buffalo cost per capita in 1920 was 60 cents. The Hydro report replies,—"As a matter of fact, in 1920, the cost of street lighting in Buffalo was not as Mr. Murray represents it to be, 60 cents, but $1.14 per capita." The difference is explained by the fact that Buffalo's street lights are more than half gas and gasoline. In concluding this item the report adds: "it is interesting to note that Toronto, with little more than half the total expenditure for street lighting, maintains nearly three times the number of street lights that Buffalo does."

On the cost of power in the Niagara district, under the heading. "Mr. Murray absurdly over estimates the renewal reserve of the Ontario Power Co.," the Hydro report states, "Mr. Murray's estimate of the renewal reserves required to be laid aside for the Ontario Power Co. plant is simply absurd; it is ten times too much;" the report continues as follows:—

"The basic assumption on which Mr. Murray has made his estimate of the cost of Niagara power is that the plant of the Ontario Power Company, on account of lack of water which Mr. Murray proposes to use otherwise, will be scrapped with the exception of 40,000 horsepower, held as stand-by. In spite of this fact, that 162,000 horsepower is thus to be scrapped under his own assumption, Mr. Murray has included in his estimate a provision for the renewal of this 162,000 horsepower of the scrapped plant, and allows the absurd sum of $2,100,000 annually, in addition to a provision of $78,000 in respect of the 40,000 horsepower which is to be retained. The annual amount Mr. Murray has thus allowed for renewal of the superseded part of the plant is enough to rebuild it entirely every three or four years, although under Mr. Murray's assumption there is no intention to rebuild it at all. This $2,100,000 is, therefore, pure inflation—not a cent of it is needed even under Mr. Murray's assumed conditions."

The report goes on:—

"Six other items which Mr. Murray has unreasonably over-estimated, while less, individually, nevertheless aggregate a very large amount in excess of the correct figures. For instance, Mr. Murray apparently neglects the fact that the costs of operation, etc., per horsepower are much smaller for a very large and modern station like the Queenston station, and thus he unjustifiably over-estimates this item. Again, when the nature of the physical installation at the Queenston-Chippawa development is considered, the renewal reserves for this plant are too high. In all, these six small items are over-estimated by about $1,500,000. One item only has been under-estimated by Mr. Murray, but this was due to circumstances occuring after he had assembled his data. However, for the under-estimated item proper allowance had been made. One item was nearly correct." Finally the report goes on:—

Costs of Operation and Renewal Reserves at Chippawa

"The capital cost of the development is accepted by Mr. Murray as $69,000,000 and he estimates the annual interest charges thereon at $5,620,000. By division it is evident that Mr. Murray has employed an interest rate of 8.15 per cent., but he carefully refrains from all mention of this fact. Mr. Murray even admits, a few pages before, that the average rate of interest which the Commission will pay on its borrowing is only 5.75 per cent., and he uses that rate in calculating interest for his first estimate. The Commission has never paid an interest rate even approaching 8.15 per cent.

"Using the correct interest rate—5.75 per cent.—it is found that the item which Mr. Murray, without the slightest justification, states to be $5,620,000, should be $3,967,500, and hence on this item alone Mr. Murray has inflated his estimates by $1,652,500.

Total Annual Production Cost

"By such artifices as have just been described, Mr. Murray has estimated a total annual production cost for power of $12,310,000—as against a corrected total even under his own assumptions, of $7,200,000. Thus he has over-estimated the cost of generation by $5,000,000 or 70 per cent. In addition, in calculating the cost of power to the Niagara system, he has under-estimated the revenues of the Ontario Power Company from its own customers, and over-estimated the amount of power taken by them, and thereby increased the inflation of his estimated cost of power to over 80 per cent.

"Summing up Mr. Murray's handling of this estimate, it is found that in the first place he has based it on gratuitous assumptions, and then, without justification, he has over-estimated all the items of cost but two, to a total extent of $5,000,000 or 70 per cent. He arrives at a figure of $25.60 per horsepower per year, whereas a corrected estimate under his assumptions is only $14.00 per horsepower per year."

Regarding a comparison of rates in Ontario, Mr. Murrany's report had stated that the private companies in Quebec delivered 84 per cent. more kw.h. per capita than does the Hydro-electric Power Commission. The Commission's answer is that one large privately owned company in 1920 had supplied to a single customer an amount of power approximating 60,000 h.p., which it is claimed makes a comparison per capita "woefully misleading."

The Hydro report also finds Mr. Murray's comparison of the cost of power in the cities of Toronto and Buffalo to be "very in-accurate." A table is included in the report showing the net average cost of energy in Toronto was $1.10 compared with $1.52 in Buffalo.

Comparison of Yearly Bills

The report contains some interesting tables giving relative yearly bills for electricity for a number of consumers in Toronto, Hamilton, London, Montreal, Buffalo and Detroit in 1920, and draws the following conclusion:

"Comparing the bills in the Ontario cities with the corresponding bills in Montreal, Buffalo and Detroit, the disparity in the costs of electrical service is very evident. Almost without exception, the bills in Toronto, Hamilton and London are lower than the bills for corresponding service in Montreal, Buffalo and Detroit. From the preceding tabular data it is seen that the differences between Hamilton bills and those in cities under private ownership, range from 5 to 600 per cent. in the case of Montreal, from 50 to 400 per cent. in the case of Buffalo, and from 75 to 500 per cent. in the case of Detroit."

The report ends with the following conclusion.

"In entering upon this discussion of the true character of the "Murray Report," it was charged that, in addition to misrepresenting the achievements of the Hydro-electric Power Commission of Ontario, Mr. Murray has made grossly incorrect and misleading statements; he has garbled documentary and other data and then employed them as premises from which to derive conclusions; he has made pronouncements based upon comparisons so inadequate as to be puerile; he has made charges which he fails to substantiate; he has ignored important factors, even disregarding most pertinent engineering data. He has seriously miscalculated the cost of Niagara power; he has omitted to describe the confines of districts he discusses; he has not shown how summaries have been derived; he has made comparisons between unlike units with respect to the costs of power; he has shown himself singularly lacking in the application of engineering economies; and he has failed to supply data essential to the integrity of the claim of reporting in an "exhaustive and impartial" manner. In a word, it was charged that Mr. Murray had employed methods demonstrably reprehensible and unprofessional.

"This charge has now been substantiated by representative instances selected from the mass of such material to be found in the "Murray Report." The varied character and comprehensive range of the subjects specifically dealt with is well disclosed by glancing over the Table of Contents of this Refutation. "

Rural Power Lines

Construction of rural power lines by the Ontario Hydro-electric Power Commission was commenced in eleven townships in 1921 as follows: Nepean, West Flamboro, Saltfleet, Ancaster, Niagara, Howard, Beverley, North and South Dorchester, Yarmouth and Nottawasaga. Seven new low tension lines were constructed in various parts of the province. The total mileage of transmission lines built and acquired by the Commission up to October 31st, 1921, was 3,001.

Northern Canada Power Company

Gross earnings of the Northern Canada Power Company, for 1921, amounted to $344,483. Operating and administrative expenses totalled $85,668, leaving net earnings $457,815. As this is the first financial statement made public no comparisons are available. After the usual deductions, net profits remained of $84,431. The balance sheet shows total assets of $7,369,266, and liquid assets of $204,696. Current liabilities are shown as $76,578.

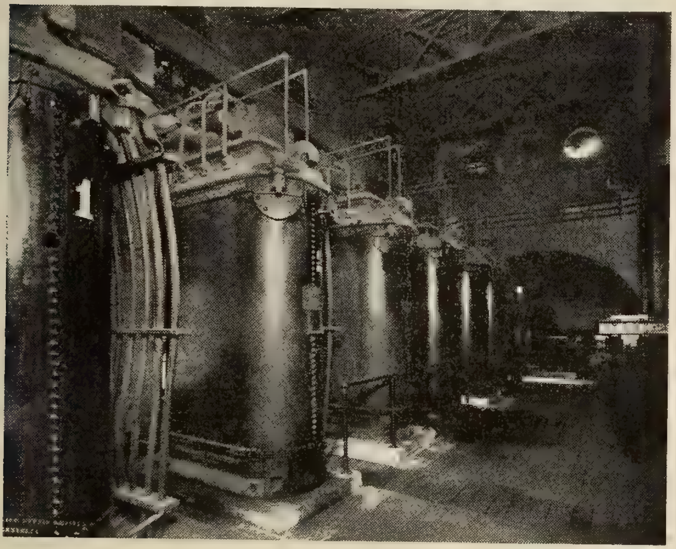
Mr. G. J. Mickler, Treasurer Association Municipal Electrical Utilities

The Application of Electricity in the Manufacturing Industry---6

Cement Plants Are Almost Entirely Driven by Electric Motors — Severe Conditions Require Rugged Construction — Adoption of Synchronous Motors and Magnetic Clutch

The manufacture of cement from its raw constituents involves a variety of crushing and grinding operations that readily lend themselves to the adoption of electric power. Certain clays and limestone are the raw material, and the crushing, grinding and calcining of these constitute the main processes of a mill.

Crushers, tube mills of various types and rotary kilns thus form the great bulk of the machinery, and it may be said that with the possible exception of the tube mill, they are not inherently difficult of adaptation to electric motor drive. Local conditions, however, are severe, due to the unavoidable prevalence of dust. Cement dust is very fine and abrasive and the atmosphere of a mill is heavily laden with it. Motor bearings are generally constructed with some special dust protector arrangement, but nevertheless there is heavy wear. In some cases the larger motors are run for as long as 12 months without rebabbitting, but this is exceptional.



Transformer Bank in a Cement Mill—Canada Cement Company

Frequent Inspection of Motors Necessary

It follows that frequent inspection is needed to prevent such troubles as would ensue if a rotor dropped far enough to touch the stator, and air gaps have to be frequently checked up. Such an inspection also corrects such matters as the collection of dust around the bearings themselves—a condition of affairs that would soon drain them of oil by capillary attraction.

Belt drive is necessary in many cases and unless the belts are tightened up much more than is usual, the dust causes slippage. This tightening of course aggravates the effect of any dust in the bearings. In this regard it may be pointed out that cast iron pulleys are used to a great extent, owing to the dust cutting up paper pulleys.

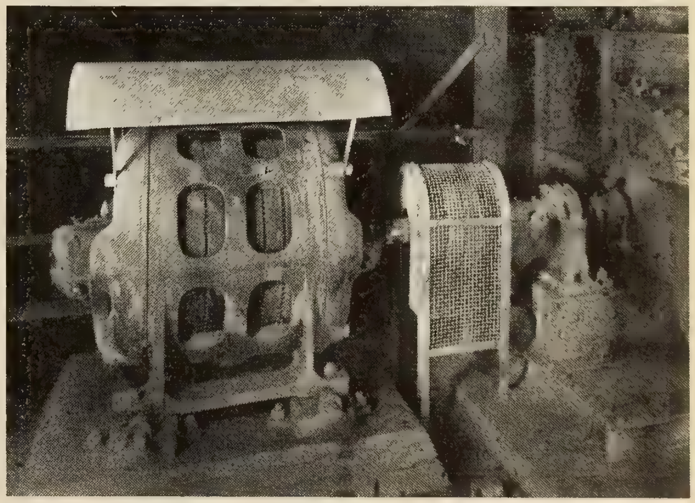
The advantages of electric motor drive, however, outweigh the troubles incidental thereto and the application of electricity in this industry has seen a gradual rise of individual motor power from a maximum of 75 to one of 600 h.p. or more. This change has been the result of the introduction of heavier mills and the demand for greater production.

It may be pointed out that alternating current is not exclusively used. There are several installations of direct current that do not give the commutator trouble that might be expected. The advantages of alternating current, however, such as its economy of transmission and cost have made it preferred by most operators.

Types of Motor Used

The question as to what type of motor is best for certain operations, is not definitely settled. It is quite usual to find a mill where all the motors are of the squirrel cage type and then to find others where slip rings are used even in the smaller sizes. The tube mill is practically the only machine that has severe starting conditions, 120 to 130 per cent. normal torque being required for starting; this is an inherent characteristic, and somewhat prohibits the application of squirrel cage motors for the larger size. These are, however, quite commonly used for tube mill drive up to the limit of 200 horse-power; in these cases they are either started from a high voltage compensator tap, or thrown direct on the line with full voltage.

Slip Ring Motors



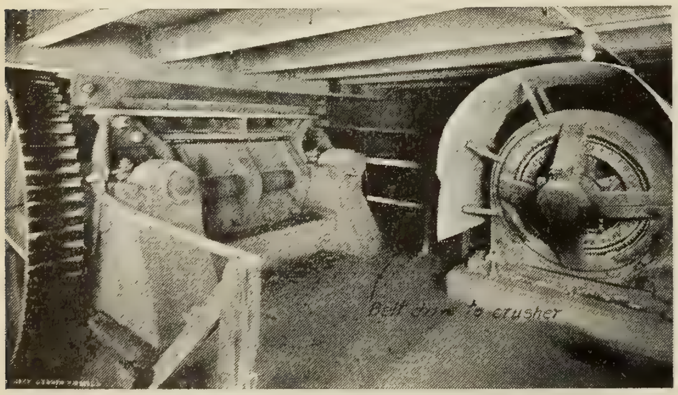
Motor Direct Connected to Swing Hammer Mill—Canada Cement Company

Slip ring motors are used mainly because of the possibility of speed variation, and because of their low starting the rings are not materially worn by the dust and hence the current and small line disturbance. It has been found that the rings are not materially worn by the dust and hence the use of the dust-proof enclosures is passing away. As mentioned before, frequent inspection is necessary for motors used in cement mills, and this inspection trip can serve as well for the cleaning of the dust from the air ducts, by compressed air, and blowing the rings clear.

The use of the compeb mill, which requires as high as 500 horse-power, has had a marked effect on the type of motor used in the cement industry. This mill is a constant speed load and the synchronous motor with its unity power-factor has been found to give a very satisfactory drive; since 1918 it has been gradually displacing the slip ring motors previously used for the purposes.

19 Induction Motors, each 175 H.P., 550 Volt, belted to tube mills. Canada Cement Co., Limited, Longue Pointe, Montreal.

The high starting torque requirement of the tube mill has been one of the difficulties in the way of a general adoption of synchronous motors, which cannot deliver 120 to 130 per cent. of normal torque during the starting period. This has been overcome by the use of magnetic clutches which allow the bringing of the mill lines up to speed after the motor is started light; this type of clutch has been developed since 1913, when it was first used in rubber mills.

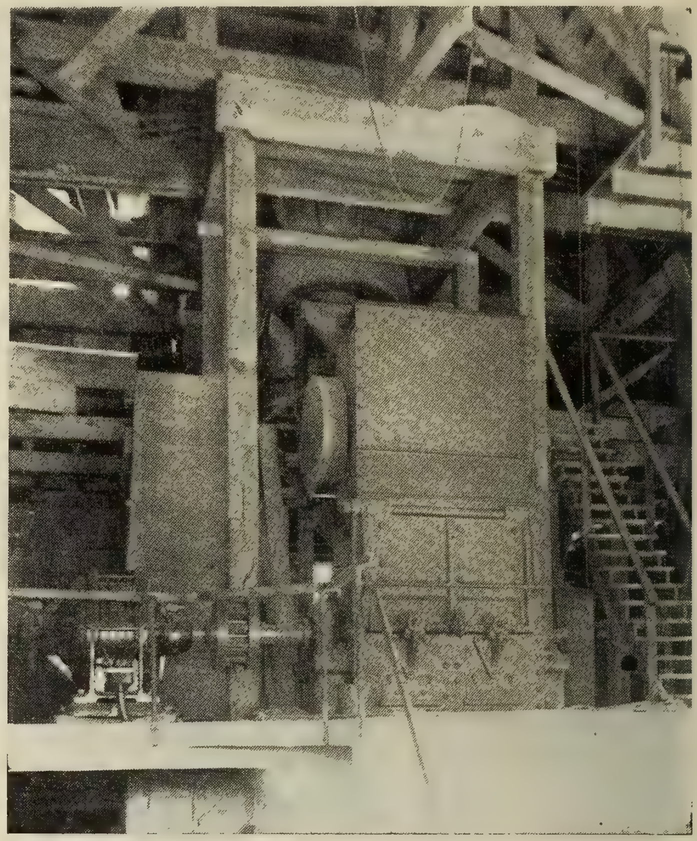


Motor Driving Crusher—Canada Cement Company

The clutch rating adopted should be that of the maximum developable power of the motor, thus a motor of normal h.p. 250, capable of developing 500 h.p. or over, should be equipped with a clutch of that rating.

As this type of clutch is operated by direct current, some source of this is required, and it is often supplied from the exciter generator for the synchronous motor.

The general appearance of the clutch is that of two annular plates, mounted in close proximity on the shaft connecting the mill and motor. One is an electro magnet carrying an annular coil, and it draws the other plate when the coil is energized. The member carrying the coil has a friction surface on the outer flange and the other member is extended to come into contact with this surface; positive clearance is provided when no current is flowing.



An Installation in Exshaw, Alberta—Canada Cement Company—Direct drive to Swing Hammer Mill

A peculiar feature of this arrangement is that as the large electro-magnet used in the clutch is highly inductive it requires up to six seconds for the clutch to reach its maximum torque. This allows of the taking up of all slack, and when the mill is started there is no shock. The clutch is often connected directly to the line with a knife switch, though some operators use a manually controlled rheostat. This is generally advised by the manufacturers, as synchronous motors with a low pull out factor are liable to be pulled out of step by a magnetic clutch connected directly to the line.

A Typical Plant

Cement plants of quite ordinary size are heavy power users. The motor equipment of one such plant is as follows:—

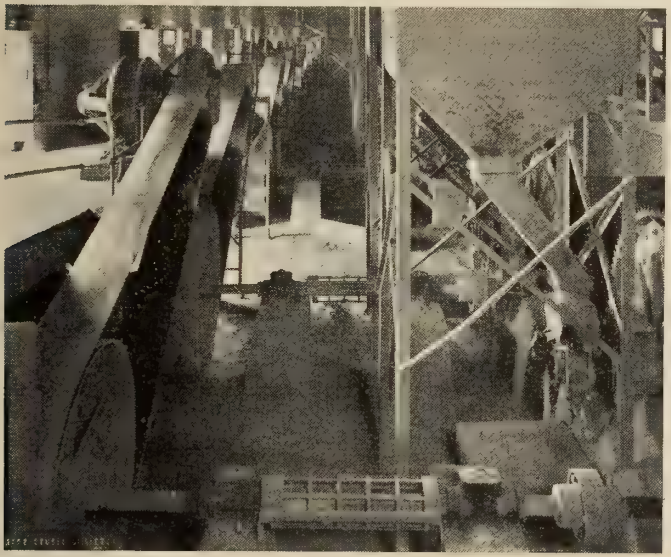
15 motors, 100 h.p. driving kominuters	1500 h.p.
19 motors, 175 h.p. driving tube mills	3325 h.p.
Group and individual drive on kilns	555 h.p.
16 motors, 100 h.p. driving pulverizers	1600 h.p.
Winch and pump motors, coal bridge motors, conveyor, belt motors, etc.	7000 h.p.
Total	14,080 h.p.

In this particular plant the majority of the motors are of the squirrel cage type and are belted to their drives. Direct current is used to some extent, at 600 volts, and is applied to the winch motors in the quarry, the water supply pumps, and the coal handling bridge.

Power House, Power-Factor Correction

Power is received at 10,000 volts, three phase, and is stepped down to 600 volts in the sub-station, which is equipped with six 2,000 kv.a. water-cooled transformers.

Power-factor correction is accomplshed with two synchronous condensers. Due to the large number of individual motors, a load-factor of 80 per cent. is about the average. The plant generally runs a 24 hour day, 7 day week and the larger motors are seldom shut down for more than a few minutes each week.



Motor Drive on Pulverizers—Canada Cement Company

Total Apparatus in Canada

At the present time there are 1,146 electric motors installed in cement plants in Canada; of these, 988 are alternating current, the remaining 158 being used in various situations where direct current is thought to be more suitable. Their combined horsepower amounts to 60,375.

These figures indicate a considerable consumption of current and apparatus, but it should be mentioned that they include only plants operating at the present time. It is safe to say that any considerable revival of business will result in a considerable swelling of the above totals.

Newfoundland Cable Taken Over

The direct United States cable from Ballingskellings, Ireland, to Harbor Grace (Nfld) and Halifax was taken over recently by the Imperial Cable from the Western Union Cable Company. The British Government purchased the cable in November, 1920, for £750,000 but it had remained under Western Union control by lease.

The cable taken over was laid in 1874 and was the first transatlantic cable to use the Dr. Muirhead system of duplex. Its first Nova Scotia landing place was at Torbay, Guysboro' county, but it was moved to Halifax in 1887

The Government's Conversion Scheme

The attention of the holders of the five and a half per cent war loan bonds maturing December 1, 1922, is directed to the offer of the Minister of Finance to renew the loan. The last Canadian loan was placed in New York but the Minister is making his present financial operation entirely a domestic one by offering to accept the maturing bonds in exchange for new bonds bearing the same rate of interest, running for either five years or ten years as the bondholder may prefer. A further inducement to the investor is that he receives a bonus of one month's interest. The only difference is that the new loan is not tax free. The terms offered are favorable to the investor and doubtless a large part of the maturing loan will be renewed. Arrangements for the exchange of the bonds can be made at any branch of any chartered bank Holders who do not wish to reinvest will be paid in cash on the 1st December.

Equipment for French Railroad Electricification

Equipment for the electrification of another section of the French Midi Railways has just been shipped from its East Pittsburgh plant by the Westinghouse Elec. & Mfg. Company. The lines of the Midi Railways are mostly located in the South of France north of the Pyrenees. As far back as 1906 the management of the railways commenced an exhaustive study of the electrification of this part of their system, having in mind the utilization of the water power available on the northern slopes of the Pyrenees. By 1914 four sections had been electrified with single phase current at 12,000 volt and 16.67 cycles, but all work was stopped at the outbreak of the war.

The French, early in the war lost practically all their coal fields to the Germans. This emphasized the necessity of developing the water power resources of the country and electrifying the railroads wherever it could be economically done. Thus on the cessation of hostilities one of the first acts

The commission, after visiting, Italy and America. re-
abroad to study existing railway systems.
of the Government was to send a technical commission
commended that 1,500 volts, direct current, be adopted as the standard for the electrification of all French railroads, and the Midi Railways Company, in conformity with this decision, immediately resumed the work interrupted by the war on this new basis. The sections already electrified at 12,000 volts will be changed to 1,500 volts direct current, so as to have a uniform system throughout.

Transmit Power at 150 kv.

The power will be generated in six stations or groups of stations capable of developing a total 362,000 h.p. the stations being put up progressively as the different sections are electrified. The head of water varies from 350 feet in the station with the lowest head to a maximum of 2,500 feet. Power is generated at 8,000 volts and 50 cycles, and is distributed to the railway sub-stations over a 60,000 volt three phase distribution system, distant points of the distribution system being connected by 150,000 volt transmission lines.

The railway sub-stations, which are located along the railroad at intervals of 12 to 18 miles, are connected directly to the 60,000 volt distribution system. They all contain rotary converters with the exception of a few in which mercury are rectifiers will be used.

The equipment for the generator stations, the distribution system, the railway sub-stations and the locomotives will be built in France. The work entrusted to the Westinghouse Company comprises a large part of the 150,000 volt transmission system, including the transformers, synchronous phast-modifiers for the voltage control, and the relay protective gear.

Electrical equipment for pumping oil wells is described in considerable detail in a publication, known as Leaflet No. 1134, which has recently been issued by the Westinghouse Electric & Manufacturing Company, East Pittsburg, Pa.

Electrical Exports and Imports

Speaking at Toronto before the Export Club, Mr. Lloyd Harris, until about two years ago head of the Canadian Trade Mission in London, gave it as his opinion that unless conditions greatly altered he did not think Canadian manufacturers had much opportunity of securing European trade for some years to come. At the same time, he thought there were still other fields open for the produce of Canada in the newer and undeveloped countries which are already buying.

Commerce Within the British Empire

The present, however, is an opportune time for increasing the flow of commerce within the circle of the British Empire. The United States has virtually shut out Canadian farm products and compelled Canadian farmers to cultivate the British market more extensively. At the same time Canadians are more than ever disposed to give preference to British over other imported commodities. British manufacturers have a unique opportunity, but they must pay more special attention to Canadian needs and conditions than in the past if they are to profit fully by it. The drive for Empire trade which is being organized in Great Britain will find a cordial response in this country, and, while the revival of Continental Europe may be essential to a complete return of British activity, a good deal of industrial slack in the old land may be taken up by a more vigorous attempt to realize the possibilities of trade under the British flag.

An examination of Canadian Import and Export figures for electrical goods as recently published, reveals some interesting facts.

It will be seen that imports are more than ten times as great as exports, proof positive that the Canadian field is full of opportunity for the home manufacturer.

Imports of Electrical Goods

Articles and Countries from which Imported.		Month of June		Three Months Ending June		
		1921	1922	1920	1921	1922
Total Electric Apparatus, n.o.p., Lamps and Fixtures—						
From United Kingdom	$	36,519	27,738	107,649	120,640	73,957
United States	$	894,568	962,271	4,442,293	2,929,210	2,568,186
Other countries	$	20,383	37,084	63,169	72,969	115,093
Total	$	951,470	1,027,093	4,613,111	3,122,819	2,757,236

Exports of Electrical Goods

Articles and Countries to which Exported.		Month of June		Three Months Ending June		
		1921	1922	1920	1921	1922
Total Electric Apparatus—						
To United Kingdom	$	1,651	73,032	33,523	13,170	146,212
United States	$	16,129	3,246	37,977	25,480	10,528
Other countries	$	25,610	65,867	34,204	92,474	105,832
Total	$	43,390	142,145	105,704	131,124	262,572

Meter Reading and Goodwill

"With others of my acquaintance," says a writer in Printer's Ink, "I have always harbored more or less animosity for the local public utility outfit, the gas company, the water works, etc.

"Then—then the awakening of conscience. My wife has been away vacationing for two months. I have had to prepare doubtful dishes and keep house. But I am absent during the day—just when, presumably, the reader of the meter from the electric light and power company calls on his rounds. At last came a letter—a courteous, altogether likable bit of correspondence. Could anyone entertain ill feelings after this:

> Our meter reader called at your premises on the 14th inst. but was unable to obtain the index. We appreciate the desirability of our customers receiving their bills promptly each month, and will be pleased to render a bill for the last period if you will kindly enter on the enclosed card the position of the hands of the meter, together with the date they were in the position indicated, the reading thus obtained can be verified later. We thank you for your co-operation in this matter and enclose a stamped-addressed envelope for the return card.

"In other words, you read your own meter."

600,000 Volt Transmission Line Constructed

An experimental transmission line for operation at 600,000 volts, the highest voltage line in the world has recently been completed at Purdue University, Lafayette, Indiana. At the present time very little is known about the phenomena of high tension transmission in excess of 220,000 volts, so the engineering experimental station of Purdue has begun work to obtain definite data. The new transmission line is based on the design by Ross Lake but was modified considerably by Prof. C. T. Harding, head of the Electrical School. The line is 1,700 feet in length and consists of three 600 foot spans of steel core aluminum cable, supported on four steel towers 65 feet high. The cross arms are 40 feet long, and the 15 unit suspension insulators are hung in such a manner so that they may be readily moved in different directions from 16 to 40 feet without taking down the cables. The conductors were donated by the Aluminum Co. of America and there is enough wire available for the complete equipping of the line in five different sizes. The voltage is controlled by means of an auxiliary transformer and double drum motor driven controller which provides 480 equal steps without distortion of the wave form.

Annual Report of Montreal Tramways Shows a Surplus

For the first time since the tramways commission was appointed four years ago the Montreal Tramways Company shows a surplus in its annual report, which was issued recently. Gross receipts show an excess of $187,947.51 over expenditures and this the report points out is in face of the fact that there were fewer passengers carried than last year. The surplus is attributable to lower operating expenses even though revenues were considerably less, the commission states.

Electrical Events at Western Points

J. G. Kerry Chosen Consulting Engineer

J. G. Kerry, of Toronto, has been chosen by a special Committee of the City Council for the position of consulting engineer for Vancouver's proposed hydro-electric enterprise. Mr. Kerry, if the committee's choice is confirmed by the City Council will be asked to investigate and report on sites that might be available for hydro-electric purposes adjacent to the city.

B. C. E. R. Co. Working at Stave Lake

At the Stave Lake Plant of the British Columbia Electric Railway Company, they have under way considerable work, employing some 200 men. They are raising the present dam, removing the old spillway and building a new one at the Blind Slough. In addition to this, they are installing a fourth generator of 13,000 horse-power capacity, thereby bringing the plant up to 52,000 horse-power. The powerhouse will be extended correspondingly.

Winnipeg Notes

The Winnipeg Hydro report hat the sale of appliances has been very good during the past month or two. They are averaging about seventy sales a month of electric ranges; they also find the demand for smaller appliances better than anticipated.

* * *

Fort Rouge telephone exchange will be in operation on the automatic system in January next and the change-over at St. John will probably take place in April, J. E. Lowry, chief commissioner, Manitoba Government Telephones, stated recently.

Most of the automatic apparatus for the Fort Rouge exchange, which is being supplied by the Northern Electric company, has been delivered and a considerable portion installed.

Two-thirds of the Winnipeg system will be automatic when the 7,000 lines on the Fort Rouge exchange and the 6,300 on the St. John cease working on the manual system. That the Garry exchange, with its 13,000 lines, is probably the largest single exchange in Canada, either manual or automatic, is not generally known, the commissioner remarked. With a two-years' experience of this exchange as an automatic, he was able to say that the changing from manual to automatic, which will eventually cover the whole system, will tend towards a reduction in operating costs and an improvement in the service. Commenting on the satisfactory working of the existing automatic system, he said that, like any delicate apparatus, it required a high standard of attention and maintenance, but, given these, it was the best and quickest service there was today.

* * *

Can. Allis-Chambers Ltd., have been awarded the contract for ornamental lamp standards over the Osborne Street Bridge by the city of Winnipeg.

Diesel Plant at Ft. Saskatchewan

The Provincial Government of Saskatchewan will install an electric plant with Diesel engine at the Provincial Jail in Fort Saskatchewan. This installation will improve the lighting and power supply of the town, which obtains its electric supply entirely from the government source.

Calgary Recognizes Organization

The most enthusiastic assembly of the electrical fraternity ever held in Calgary met over dinner in the Elizabethan Rooms of the Hudson's Bay Company, on the evening of August 8th, in the interests of electrical development and organization. The meeting, which was attended by some seventy members with R. A. Brown, city electrical engineer in the chair, was arranged at the instance of the local electrical jobbers and was addressed by Kenneth A. McIntyre of the Society for Electrical Development, and Laurence W. Davis of the National Association of Electrical Contractors and Dealers. In his solicitation for members to the Association, Mr. Davis met with 100 per cent. response from the electrical contractors and dealers. Quite a number present, also, not privileged to full membership, enrolled themselves as associate members. A local representative body was immediately formed, the executives being: G. M. Wilkinson, Cunningham Electric Company, Limited; J. J. Cassidy, Crane-Cassidy Electric Company, Limited, and G. M. Morton, Electrical Engineers, Limited. An early meeting of all members is being arranged.

Good luck Calgary, Carry on!

Activity Among Western Electrical Contractors

S. O. Bell, electrical contractor and dealer, North Battleford, Sask., has been awarded the contract for wiring 5 stores for H. R. Bowers, hardware dealer, North Battleford, Sask.

* * *

The P. A. Electric, Prince Albert, Sask., were recently awarded the contract for wiring and for lighting fixtures, of the Union Trading Store, Central Ave.. and River Street, Prince Albert. The work is being carried out in conduit. The fixtures installed were all 12 by 8 white lume balls, chain hangers.

* * *

Mr. H. W. Davy, electrical dealer & contractor, Prince Albert, Sask., has been awarded the contract for wiring and lighting fixtures, for 7 stores, on Central Ave., Prince Albert, Sask.

* * *

The Electric Shop, Ltd., Saskatoon, Sask., have been awarded the contract for the Presbyterian College. Saskatoon, to instal wiring, switchboard and lighting fixtures.

* * *

The Electric Shop, Ltd., Saskatoon, Sask., have been awarded the contract by the Saskatoon Hardware Co., Saskatoon, to instal wiring and lighting fixtures in their new building.

* * *

The Wheaton Electric Co., Ltd., Saskatoon, Sask., have been awarded the contract for the Scott Dairy Co., Ltd., Saskatoon, to instal the wiring, switchboard, and lighting fixtures, at an estimated cost of $1,550.

* * *

The Wheaton Electric Co., Ltd., Saskatoon, Sask., have been awarded the contract for the new Chemistry building, University of Saskatchewan, Saskatoon, to instal wiring, switchboard, underground cable, and lighting fixtures at an estimated cost of $21,000.

The Canadian Radio Field

Radio Exhibition Will be Held at Toronto

During the last two days of the Canadian National Exhibition, Sept. 8 and 9, a gathering of radio enthusiasts, manufacturers, jobbers and dealers will be held at the Prince George Hotel, Toronto. It is stated that there will be on hand a variety of radio apparatus for their inspection, and that an interesting programme, including a banquet and lectures by prominent men in the radio field, has been arranged. As the first thing of its kind, this radio show should prove interesting to all concerned in wireless matters.

"Ether Pocket" in Canada

There is an "ether pocket" somewhere in the Lake of Bays district, in the opinion of engineers of the Canadian Independent Telephone Company. The first intimation of the Lake of Bays pocket came with the discovery that none of the big broadcasting centres, could be heard at Bigwin Inn, although the apparatus there installed would have ensured, under normal conditions, the reception of programs from anywhere within a radius of 500 miles.

Exhaustive experiments were made. The Canadian Independent Telephone Company took up the matter, and sent engineers up to personally operate the receiving equipment at the summer resort. Tests were broadcasted, under varying atmospheric conditions. Some of the tests were made during the day time, and others were conducted as late as midnight. In no case did the transmission reach Bigwin Inn satisfactorily. Even comparatively near wireless stations on Lake Ontario were practically inaudible.

The first theory was that there was a big mineral deposit somewhere between Toronto and Lake of Bays, that attracted the radio waves and grounded them. But this theory did not hold when it was found that transmission coming from any direction was affected in the same way as that from Toronto. There is hardly likely to be a mineral deposit large enough to extend in every direction in which signals were coming. "It is evident," says General Manager MacKay, of the Telephone Company, "that this particular place is one of those localities to which, for some reason unknown, radio signals are transmitted with extreme difficulty. That such places exist is well known in the radio art, and, strange to say, several such locations are known on the ocean as well as on land."

Radio Tells Surveyor His Real Position

The National Resources Intelligence Branch of the Dominion Department of the Interior is using radio for surveying work. The Department has issued the following statement in regard to this innovation:

What radio can do as an entertainer and as a means of transmitting messages and news is fairly well known, but perhaps the immense service it can render in making certain kinds of work more efficient and valuable is not realized. An example of this is the work being done by the Topographical Survey Branch of the Department of the Interior in the Mackenzie River district, where the recent activity in the development of the oil fields and mineral claims has brought with it a demand for accurate surveys far away from the existing surveys of Dominion lands. Surveyors employed on these surveys are carrying with them as part of their equipment small radio receiving sets. The music that will interest them most will be a few faint ticks which represent something of great importance to a surveyor—correct time.

When the radio fan hears the time signal come through at the close of the evening's broadcast program, he checks up his watch so that he can be on time in the morning. Things are otherwise on the Mackenzie. In the surveyor's camp there are much more important uses for time. He can use it in his work for a variety of purposes, one of which is to find his true longitude, or east-and-west position.

He is able to get his local time very accurately by taking observations of the stars with his surveying instruments. After he has done this, let us suppose that, while listening in with his radio set, he receives a time signal from Ottawa. He finds that the time in Ottawa is exactly so many hours, minutes and seconds faster than his local time. By means of a few calculations, he changes time into distance, and the result tells him just how far west of Ottawa he is. In actual practice the surveyor does not have to depend on time signals from Ottawa, but is able to get them daily from a number of high powered stations in various parts of the world and he calculates his longitude from Greenwich instead of from Ottawa.

Is Most Accurate

Various other means of finding the longitude of a place have been used by explorers and navigators, but the use of time signals was the only way easy and accurate. Where the tlepraph was available, the signals could be sent by wire, but elsewhere less reliable methods had to be used.

With the long arm of the radio time signal, the Topographical Surveys Branch expects to be able to reach out far beyond the end of the longest telegraph wire, and locate the correct position of any point with a probable error less than the length of an ordinary city block; in fact the Dominion Observatory, by using instruments more elaborate than those used in surveying, has determined longitudes which are estimated to have a probable error about equal to the width of a street.

Radio at Canadian National Exhibition

A demonstration of radio is included as one of the new features of the National Exhibition at Toronto, Ont. The programme laid out embraces a continuous eight-hour programme by wireless telephone, an explanatory motion picture, operations by a travelling radio station and the distribution of helpful literature to radio amateurs.

Headquarters of the demonstration are in the Radio Building which is located on the grounds to the southwest of the Government Building. This building is divided into two auditoriums, one, the concert hall, and the other the motion picture theatre. The continuous programme heard in the concert hall includes news bulletins, a complete sporting service with scores from the three big leagues, addresses by prominent visitors, weather forecasts, fashion talks and special features.

In the theatre half of the radio building is shown Canada's first motion picture study of radio operations. The film portrays both broadcasting and receiving stations and gives an explanatory sketch of radio's development. An additional feature will be the broadcasting of addresses from the director's daily luncheons in the administration building These addresses will go back by microphone and direct wire and thence be broadcasted by wireless telephone as part of the daily programme. It will mark the first attempt at such operation in Canada.

Radio Versus the Wired Telephone

At the present time radio telephony is, to the great majority of people, essentially a device for amusement. The opinion is generally held, that its adaptation to the everyday uses of communication is but a step and that communication by this means will soon be possible with the same ease as with ordinary telephony.

Those actually engaged in wireless work are not so optimistic. The difficulties that stand in the way are more apparent to them, and as a consequence their opinions are more conservative. The whole question has been taken up in England by the Radio Research Board, and an investigation made of which a report has just been published.

The sub-committee which carried on the investigation, consisted of Admiral Sir H. B. Jackson (chairman), Prof. C. L. Fortescue, Prof. G. W. O. Howe and Major A. G. Lee, held eight meetings, at which witnesses from Marconi's Wireless Telegraph Company, the Radio Communication Company and the fighting services were examined.

Findings of the Committee

The conclusions arrived at are summarized below:—

(a) The development of radio telephony for long ranges is in an extremely elementary stage, and no line of development which would be likely to lead to its establishment on a commercial basis within a measurable period is visible.

(b) For ranges of the order of 1,000 miles in certain remote localities, where the interference from atmospherics and other radio communications is not excessive, it would be possible to establish non-secret radio telephonic services using waves of the length usually employed by medium power radio telegraph stations communicating over the same range. The power necessary for radio telephony, however, would be much greater than that required for satisfactory communication by radio telegraphy over the same distance.

(c) For ranges of the order of 200 miles, the position is more hopeful, and the lines of experiment which are being followed will lead to the development in a reasonable time of a system of radio telephony which will approach approximately at any rate to the requirements of a commercial system.

(d) The use of radio telephony as a substitute for any other means of telegraphic communication cannot be recommended except in those cases where the special requirements can be met in no other economic way—for example, the broadcasting of intelligence of general information where one costly transmitting station supplies a great number of simple, inexpensive receiving stations, seems a practical commercial problem, especially in localities ill-equipped with land lines.

Telephone Inferior to Telegraph

All the witnesses examined agreed that for the transmission of a specific message over any distance—long or short—the radio telephone was greatly inferior to the radio telegraph in accuracy, speed and cost, and was likely to remain so. They agreed also that the articulation of the best radio telephone installation known to them compared favorably with that over a trunk land line, but that it was necessary to repeat or spell unusual words or proper names and repeat figures. The Sub-Committee consider, therefore, that the spheres of utility of the two systems are as separate and clearly defined as those of land line telephony and telegraphy.

Sufficient Power Must be Used

It is pointed out that for successful operation a radio telephone installation must satisfy the same requirements as a land line system. It must give at least as good articulation, and sufficient power must be used to overcome all interference from other signalling or from atmospherics. At the same time this power must not be so large that running and maintenance costs are excessive. The interference of atmospherics is very variable both in respect of locality and season, and in certain localities communications may be interrupted from this cause for hours or days, even when very high transmitting powers are used. Further, some degree of secrecy must be provided. The ideal, of course, is absolute secrecy; but a service might be considered commerciallly possible if the interception of a conversation required costly and elaborate apparatus needing skilled adjustment.

Lack of Secrecy

In the Sub-Committee's opinion the possibility of establishing satisfactory radio telephone communication on a commercial basis over long distances—3,000 miles or more—is remote. Witnesses variously estimated the powers necessary for such services to be from three to twenty times greater than those at present considered necessary for similar radio telegraph services over the same ranges. The necessary charge for a conversation would accordingly reach an impracticable figure. No means are at present known by which any appreciable secrecy can be obtained for a conversation taking place at such a range. The interference with other radio communications would be greater than that due to two radio telegraph stations communicating over the same distance on the continuous wave system, owing largely to the increased power. Radio telephone communication would be exposed to atmospheric interference, and the interference of other radio stations, to a greater extent than radio telegraph communication over the same distance. For medium ranges the Sub-Committee consider that the difficulties as regards a commercial service are practically the same as those for long distances.

Conditions of a Commercial Service

The Sub-Committee consider that the conditions requisite for a commercial service can be met at the present time in the case of a service over a short range to the following extent:

(a) The articulation is approximately as good as on land lines of similar length.

(b) It seems probable that a full twenty-four hour's service could be maintained in most localities.

(c) Atmospheric disturbances and, under present conditions, interference by and with other stations are very much less troublesome on the short waves used, so that delays of traffic through these causes are less probable, and the power required is not excessive.

(d) Unauthorized reception is made more difficult by the use of short waves, but conversations can be picked up by special apparatus. In the case of very short waves, the transmission can be made to some extent directive—i.e., the waves can be made stronger at points on the line joining the transmitter and receiver than at points off that line, thus reducing the area over which interception is possible. In any system, irrespective of distance, the use of different wave-lengths for transmission and reception at a given station makes it more difficult for one person to overhear the whole of a conversation.

(e) There are no insuperable difficulties in the system being worked satisfactorily in connection with the ordinary trunk lines, and, as far as subscribers are concerned, the conversation can take place exactly as with the land line system —i.e., the subscriber has not to instal in his office any special apparatus or to manipulate any switches during a conversation.

Wireless Notes from Everywhere

Near the Pole

The most northerly wireless station on the globe is probably at the village of Noorvik, just inside the Arctic Circle, with a population of 350 Eskimos.

4,000 Vacuum Tube Sets

In Toronto there are said to be now between three and four thousand vacuum tube receiving sets. This estimate is made by certain officers of the Wireless Association of Ontario, based on some facts which they have.

New Stations in Gambia, West Africa

The British annual Colonial report for Gambia notes the completion of wireless telegraph and telephone stations in that colony at Bathurst and at McCarthy Island, distant 176 miles. These stations are intended for internal communication, as the colony has no organized telegraphic wire system.

Big Radio for Poland

The building of one of the most powerful radio stations in the world, which the Polish government has undertaken in Warsaw in co-operation with the Radio Corporation of America, is advancing successfully. According to an announcement in the Warsaw press, this station will be working by October of this year.

To-day's Equipment Obsolete in 10 Years

An invention likely to cause a revolutionary change in wireless long-distance work has been made by Dr. Irving Langmuir, the world-famous physicist. Senatore Marconi recently paid a visit to Dr. Langmuir's laboratory to see it at work. It is a simple tube for the generation of powerful wireless currents, and its possibilities are such that it may "scrap every big plant in existence when fully developed." Mr. Marconi has himself recently predicted that to-day's equipment will be obsolete ten years hence.

Weather Reports by Wireless in France

The Eiffel Tower radio station at Paris is preparing to send out telegraphic weather reports and forecasts three times daily. A suggestion has been made that radio receiving sets be installed at central points in the various country communes and that the information thus received be signaled to the farmers by a code of sound signals from the church bells. For example, no signal if no change in the weather forecast; 3 strokes of the bell if rain is expected; 6 strokes for frost; and 10 strokes for wind or hail storms.

Belgian High-Power Station

Work is in progress on the first large radio station for international traffic in Belgium. Up to the present time the Belgian wireless service has been limited to reception from the high-power stations of other countries and distribution to points in Europe via land wire. The fact that the circuit was available only to traffic in one direction has prevented the development of the service. The completion of this new station at Bruges will make it possible to handle a considerable volume of the foreign communications of Belgium by radio.

M. Charbonelle, the Belgian telegraph engineer, is experimenting with a high-speed transmission of written messages, the received message appearing in actual long hand equivalent to a photograph of the original written message filed at the transmitting station.

Time Signals

One of the most remarkable developments in wireless broad-casting is the extensive transmission of time signals. Started in 1909 by the Eiffel Tower, the sending of time signals is now a feature of over forty of the world's chief wireless stations. They are sent out on widely varying wave-lengths and systems. The familiar time signals of the Eiffel Tower make it easy with a little practice to register the correct time to within a half to a quarter of a second.

Impulses Amplified 100,000 Times

A remarkable new receiving apparatus, invented by Major E. H. Armstrong, is stated to amplify wireless impulses more than a hundred thousand times, and to be many hundreds of times more sensitive than the best heterodyne receiver. It has been recently described at the American Institute of Radio Engineers, and has caused intense interest. Much depends upon the evolution of the receiving apparatus in long-distance wireless; the more sensitive that it can be made, the less power will be required for transmission.

Automatic Recording of Wireless Messages

Further progress has been made in the automatic recording of wireless messages, in the shape of a new apparatus which allows of two messages of nearly equal wave-length being simultaneously registered in the operator's absence. Despite the sensitiveness of the device—which is the work of Mr. F. W. Dunmore, of the American Bureau of Standards—it can be used to record messages on an aeroplane, being proof against vibration.

From Moscow to Berlin

A method of wireless telephony that has been used between Moscow and Berlin (over 1,000 miles) with success and is stated to give remarkable true rendering of the human voice is known as the Pungs-Gerth system. Its chief feature is the novel way in which the microphone currents are made to influence the currents radiated from the antenna by a new magnetic device giving great purity of tone and distinct speech reproduction.

An English Radio Concert

English newspapers are beginning to give wireless concerts. One of the receiving stations arranged for a Daily Mail wireless concert from The Hague was at the offices of a well-known London electrical firm. On the appointed evening a large audience had assembled before the scheduled time. Seven o'clock arrived, but the loud-speaking apparatus which had been set up remained dumb, and it was apparent that something was wrong. Whether it was the inadequacy of the transmitting power which was small or that the atmospherics and Croydon were to blame, the fact remains that a large crowd was disappointed. An attempt to mitigate their chagrin was made by the running over of a few gramophone records, and, later, by a wireless concert from a nearer source. The first was rather nerve-racking, and the second was reminiscent of the earliest phonographs. It is only fair to say that in several places The Hague concert was received—these places being chiefly upon the East Coast. It is evident that the art has been more highly developed in the Canadian fields.

BETTER MERCHANDISING

Contractors Too

A prominent central station man stated in conversation the other day:

"This coal situation is not only a wonderful opportunity for the manufacturers and dealers in electrical heating equipment but the contractor can reap a harvest too if he is wide awake. House holders are intensely interested in securing some form of heat for the early winter, and expense, in many cases, will not be a prime factor. If contractors will first explain to the householder the merits of electric heating as an auxiliary to coal, they will easily convince him of the wisdom of having his house re-wired. It is the Contractors' Harvest time as well as the Dealers'!"

We believe this is sound reasoning.

The trouble with both our electrical contractors and our electric merchants is that **they don't go after business.** They wait around for it to come along. Experience has proven, however, that the "go-getters" are the successes. Right now the harvest is golden ripe. If you have never tried it before **get out to-morrow and look for business.**

Mrs. Byer Tells How a Real Contractor Beat a Cut-throat Competitor

A Case Where Service and Square Dealing Meant More to the Customer than Mere Cheapness — Note the Completeness of Ben Socket's Estimate

Editor Electrical News.

I thank you for printing my first letter.

My intention was to write you this time about some of my own experiences in dealing with the electrical contractor-dealers while intending to buy certain electrical appliances and to have some small matters attended to in our home; I have decided however, to postpone it for another letter.

The other night Ben Socket came in all pepped up, as my husband expressed it. He landed a job by trying real business methods. I hasten to send his story to you, believing that it will make interesting reading to your subscribers. There were, however, so many trade details in connection with it, that my husband asked Ben to write it down for me; I hope you will know where they belong to and will put them in the right place.

Mr. Prospect Asked A Price

A short time ago a man, whom I shall call Mr. Prospect, came into Ben's place of business asking for a price on electrical installations in a house he had under construction for his own home.

Mr. Prospect had visited, some time previous, what he called a modern electrical home, and both he and his wife had decided to have a fully modern home, which they were told was a house properly and adequately wired for light, heat and power.

As it happened, Ben had had something to do with that electrical home, and on one or two occasions was showing the visitors around explaining to them the electrical equipment.

The house Mr. Prospect was building had a basement, which they intended to use for a laundry, a hall, living,dining rooms and a kitchen on the ground floor and two bedrooms, a nursery and a den on the floor above. Ben secured the plans of wiring details of the electrical home, and advised his prospective client that to have the house wired to provide proper electrical arrangements it would require 33 light outlets, 24 convenience outlets, of which 7 would be of what he called "duplex" type, and 21 switches. He offered to do this work for $238.41, and was just waiting to hear: "All right, Mr. Socket, you may start on it as soon as the house is ready to be wired." Instead, however, he was told neither yes or no, but promised an answer, shortly, by telephone.

Socket checked his figures again

A few days later Socket went to enquire about the job, but there was no reply for him as yet. The same afternoon he was telephoned to by Mr. Prospect and asked if he would undertake the work for $175.00 with the usual, "I would rather give this work to you than to anybody else, for several reasons, but your price seems to be unreasonably high."

Socket this time took a course that any sensible business man should take; he checked over his figures again and informed his client that he could not do this work the way Mr. Prospect would like to have it done and according to the standards of respectable contracting for any less than he had quoted. He pointed out that his work must be done by men who are properly skilled and who have to be paid a fair living wage; he has to put in the necessary amount of material to do the job right and of a quality this kind of work requires; that any work he does must cover his overhead expense and that he certainly must get some profit out of the work as otherwise he could not exist in business. He advised Mr. Prospect that he was quite prepared to show him his estimating sheets and to explain every item, to satisfy him that the work is worth the amount asked.

Ben Socket was determined to get that job; he knew well that it depended on good salesmanship whether he got it or not at the figure he quoted. Armed with his estimating sheets and a few samples of the kind of supplies he intended to use, also some of inferior quality, he went to see Mr. Prospect. On his way he met Plug, who was also tendering on the same job, and whose original tender was almost the same as Socket's. Plug had succumbed to his usual habit of meeting the price of his competitor no matter what loss it might entail to him and accepting work at the client's own price and this time he made some money by not losing any —because he did not get the job.

Socket found that Mr. Prospect was quite open minded when he submitted his reasons for asking the price he did but, like most people he wanted to be shown. He told Ben, that after he spoke to him for the first time he had asked Plug to figure on the same job and that Plug's tender was $230.00. In conversation with a friend, however, he had mentioned that he intended to have his house wired the same way the electrical home was wired and his friend had recommended what he called a splendid and cheap electrician, who does such work very reasonably.

As a result, Curbstone, the splendid and cheap electrician was asked to put in his tender, which he did at $175.00.

"Being anxious to find out how you fellows are calculating your work, I have asked Curbstone to submit to me in detail, cost of his material and price for work," said Prospect to Ben," and here you can see it for yourself."

Curbstone's tender was as follows:

93	Outlets	.80	$74.40
4	3/W Flush Switches	1.10	4.40
17	S.P Flush Switches	.80	13.60
24	Flush Base Receptacles	.90	21.60
1	Flush Floor Plug		3.50
1	Bell Ringing Transformer		1.75
1	4 Drop Annunciator		17.00
1	Comb. Floor Push		1.75
1	Buzzer		.75
2	Push Buttons	.65	1.30
1	Stove Main & Special circuits		20.00
1	Panel Board Steel Box circuits		15.00
			$175.05

Switch Receptacles

	Circuit	Light Outlets	Switches S. P.	Switches 3/W	Recpt.	Flr. Plg.	Transf.
Basement	8	6	1		1		
Grd. Floor		12	8	2	9	2	1
1st Floor		12	6	2	10		
Garage		3	2		4		
TOTAL	8	33	17	4	24	2	1
Plus 3/W Sw.		2					
Plus Mains		2					

"I asked you if you would meet that price—which you have refused—and Plug, asked the same question, after a little hesitation said he would. I would like to know why you persist in asking such a high price for that work and how you arrive at it."

Socket felt that this was the time to play his strong hand and pulled out his estimate showing not 93 outlets at 80 cents per outlet, but an exact statement of every bit of material used, the amount of time necessary to do this work, 25% for overhead expense, which must be covered, and a reasonable profit of 15%.

This was his calculation:

Quantity	Item	Price	Total	Time
1653 ft.	No. 14 R.C. S.B. Wire,	7.76M.	12.83	
185 ft.	Circuit Loom,	15.00M.	2.78	
460	5-1/2" Split Knobs	15.00M.	6.90	36
370	3" Tubes, (Porc.)	7.20M.	2.56	
100	4" Porc. Tubes,	8.40M.	.84	
	Leatherheads & Nails,	.45	.45	
45	Switch & Plug Outlet Boxes,	11.50C.	5.18	8
2	Floor Receptacles	2.61	5.22	1
7	D. X. Base Receptacles	.80	5.60	2
17	S.P. Fl. Switches	.42	7.18	2
17	Base Receptacles	.47	7.99	4–1/2
4	S/W Switches	.54	2.16	
1	Bell Ringing Transformer		1.10	2
1	Buzzer,	.65	.65	1/2
1	Annunciator (White Enamel) 4th N.K. Trimming	12.42	12.42	1
2	Push Buttons	.75	1.50	
1	Comb Floor Push Button		.98	1/2
1	Residence Panel 8 circuit		23.40	4
3 ft.	1-1/4 Conduit	.20	.60	1
1 ft.	1-1/4 Condulet	1.68	1.68	1
1	60A. 250V. 2P. S.T. Safety Switch		5.60	2
16	10 Amp. Fuse Plugs	.03-1/2	.56	
4	60 Amp. 250V. Cart Fuses	09	.36	
15 ft.	1" Conduit		2.10	2
1	"E" Condulet, 1"	.59	.59	1/2
14 ft.	No. 2 R.C. D.B. 1"	75.25M.	1.06	1/2
35 ft.	No. 6 R.C. D.B. Standard	39.09M.	1.37	1
2	No. 1 Ground Clamps	.10	.29	1
	Locknuts, Bushings Tape, &c.		1.50	
	Inspection,		6.00	
	Total		121.36	77
	Tax 2-1/4%		2.73	
			124.09	
	Time 77 hours at .60		46.20	
			170.29	
	Plus 40 per cent overhead and profit		68.12	
			238.41	

Socket and Prospect went over every detail of the estimate. Ben explained to him the advantage of having work done by a reputable contractor, whose business standing in the community is the guarantee of his work. He pointed out that although the actual cost to him of some of the supplies is lower than quoted by Curbstone, his quality is superior. He was able to make Prospect see by his argument that to have an electrical installation properly done is not an expense but an investment. As to Curbstone's tender, Socket pointed out that he knows of an electrical contractor, or at least so-called contractor, by name Carpetbagger, who would probably undertake this work for $156.45 or if pressed for 155.00.

"But," asked Socket, "why do you prefer, Mr. Prospect, a dollar to the German mark?

"Because, you know our dollars are good and you can bank on them; because you know that they are what they represent."

Socket walked out from Prospect with an order to wire his house for $238.41 and an undertaking to let him know how much fixtures would cost for that house.

It was not the few dollars Socket was making out of this particular job Mr. Editor, that made him feel satisfied with himself. It was the realization that he was able to use business methods in conducting his own business, of which he began to be somewhat doubtful under the pressure of Curbstone's and Carpetbagger's competition. Besides he felt that he had Prospect and Prospect's friends who may ask his advice on electrical work—well convinced that one cannot expect good dental work from a blacksmith, and that an electrical contractor has just as much right to be in business to make a profit of it as has any other professional or business man.

Yours very truly,
Mrs. I. A. M. Byer.

Outlet Distribution

	Bkts.	Centres	Switches S.P.	Switches 3/W	Recpt.	D.X. Recpt.	Fl. Plg.	Bell Transf.
Basement		6	1			1		
Grd. Floor	2	10	8	2	8	1	2	1
1st Floor	2	10	6	2	5	5		
Garage		3	2		4			
Total	4	29	17	4	17	7	2	1

How Successful Contractors Handle Business

It is a fact that many wiring contractors are bewailing the hardships of their lot. They claim, generally, that their prices are cut by irresponsibles, who do the work at less than cost. Nevertheless, there are many successful men in the business. In an attempt to get at the reasons for their success, a survey has been made by the "Electrical News," and the methods used by some of the chosen ones are outlined below.

The wiring contracting business has an element of adventure in it that is undoubtedly attractive, but it is too far fetched to say that a gambling, desperate class of fellows are drawn into it for that reason, nevertheless, the vocation seems to peculiarly lend itself to business practices, that compared to ordinary mercantile transactions, are about the same as a man walking on a tight-rope compared to a man walking on the street.

Instances of this and the disasters that follow, are easy to give, in fact, the monotony of the spectacle is rendering us callous to it. Under-cutting is the word, and a few hazards that turn out badly result simply in one more quitting the field of private enterprise. This gradual elimination would not be a bad thing but that a new crop springs up, which operates on the same basis as the has-beens.

The turn-over in the electrical contracting field is enormous and the fault lies with everybody.

In the whole field, of course, there are plenty of successful house wiring contractors to be found. Their methods are varied, but the results achieved are the same—**consistency** in a sound policy is a common feature of all of them.

The "Stone" Wall Contractor

Among the successful types of wiring contractors the "stone wall" type is certainly worth of notice. This is the type of contractor who never quotes a price lower than he knows will give him a profit. He is undercut time after time, but goes steadily on his way without worrying. His jobs are well and carefully done, his costs are accurately figured and he has enough capital back of him to carry him over bad times.

One contractor of this type explained his success as due partly to the fact that he trained his men carefully and managed to keep them working steadily. It is true enough that a mechanic who is given a job for a while and then is thrown out of work when the rush is over, is not likely to have much loyalty to the concern that he so serves him. This loyalty is reflected in his work and the whole thing works around in a circle to the benefit of his employer.

It is apparent that this man who makes his mainstay the giving of good service at a fair price, is enabled to do so only by having an accurate knowledge of his costs.

The Efficiency Expert

There is another type of contractor who runs his business carefully and keeps a number of men constantly employed, though he does occasionally take bids at cost. This man works on principles of efficiency and here are a few of his practices:

(1) Will not pay high rent.

(2) Employs only first class mechanics.

(3) Pays a good deal of overhead expense from profits on sale of staple material.

If he does take a contract at a very small margin, he does so to keep his men employed. It is odd to see this man selling supplies to competitors but he does it without a qualm, figuring that the profit he makes is their contribution to his success.

The rent proposition he explains by saying that he does not need a stand in an expensive locality for his type of business. Customers do not come to him as they would to a retail merchant, in fact, he goes after them.

William Speakwell

William Speakwell does business on the glad hand, treat 'em nice, principle. He has a bunch of friends, business and otherwise, and freely admits that he gets contracts because people, including architects, are recommended to him by others. Jobs apparently come easily to this chap, but it must be remembered that it is difficult for a man to acquire such a wide circle of friends. William has apparently laid in a good foundation in days gone by and now he is cashing in on it. Of course, his work is well up to standard.

The Strategic Contractor

The strategic contractor is one who does contracting for strategic reasons only. As a matter of fact, he doesn't do any contracting at all. Long ago he became disgusted with the amount of work he had to do for very small returns, and decided to concentrate on the merchandising end of his business.

However, he had to face the fact that customers expected him to do wiring. If they came in and bought fixtures, they naturally expected him to install them. In fact, this man says that most people regard merchandising and wiring as inseparable as a chair and its legs, nevertheless, he did not like the wiring game, with its overhead and "chasing around." So he turned the matter over in his mind and finally worked out a scheme whereby, nominally he accepts any contracts that people ask him to do, but in reality turns them over to a contractor, under a working agreement, whereby the contractor does all the service work on the appliances sold by the merchandiser.

This man is not a contractor, but he is so regarded by all the people that buy electric appliances in his store, and he says the scheme works successfully.

General Schemes

There are many methods of securing non-competitive wiring business and these are usually based upon the application of merchandising methods to the sale of wiring. Education of the public is an important matter because it is generally ignorant on the subject and unable to judge as to whether a contractor's proposal for wiring is up to a proper standard of workmanship, capacity and adequacy of outlets. The same limitations apply to a large extent to architects, and builders and the only remedy is in education.

Convention of Contractors and Dealers in Toronto, November 13 and 14

The exhibit of the Diamond State Fibre Company of Canada, Ltd., this year will be at Booth 80-A, Industrial Building, Canadian National Exhibition. They will be displaying all their materials, as well as all parts they manufacture, including radio equipment.

Change Made in Name of Westinghouse Subsidary

The business of the Pittsburg High Voltage Insulator Company will be carried on in the future under the name of the Westinghouse High Voltage Insulator Company, according to announcement made by C. M. Semler, general manager. The change in name, which was made by vote of the company's stockholders does not affect the management or method of conducting the business of the company which will be carried on as it has been in the past, according to the announcement.

The Electrical Equipment of a Modern Collegiate Institute

Present-day Requirements Embrace a Variety of Uses—Lighting, Power, Signalling—Connected Load 147 Horse Power

The electrical equipment of the modern collegiate institute requires very careful selection and consideration to meet the full requirements of all the different forms of classes in this type of building. If classes are to be held at night the lighting will require special consideration in the classrooms and the laboratories. The auditorium requires to be well lighted to permit the use of the same as a community center and the general practice is to locate the auditorium in the center of the building for convenience, therefore the only means of daylight will be from the skylight in the ceiling. The power equipment, particularly for the ventilating and operation of machines for vocational training, will require to be of special design. The lighting of the class rooms should be designed to prevent any eyestrain. It should not be glaring, but should be well diffused and distributed to prevent shadows. The regulation size of classrooms should be equipped with not less than six units. The size of the unit would be determined by the mounting height, spacing and finish of the walls and ceilings. Great care should be exercised to give sufficient illumination on the blackboard in order to read the writing on the board from the last row of seats, without straining the eyes.

Large Units Required

The Hamilton Collegiate has recently been entirely rewired and relighted to conform to the very best practice of this type of building. The construction of this building was such as to require large units owing to the high ceilings and the finish being of a white pine stained and varnished. The walls are tinted a light green with blackboards on all sides of the room. The conditions did not provide good reflecting surface conditions. It was found necessary to use 6-200 watt units mounted 10 ft. from the floor and 10 ft. centers, approximately. This gave very fine lighting with no eyestrain. The four-in-one totally enclosed unit was used throughout the building, including the halls, with the exception of the cloakrooms, toilets, basement, and auditorium. The units in the "Balance" rooms were of the 100 watt size and mounted 6 ft. spacing and 9 ft. from the floor. This gave very satisfactory results for this very exacting work.

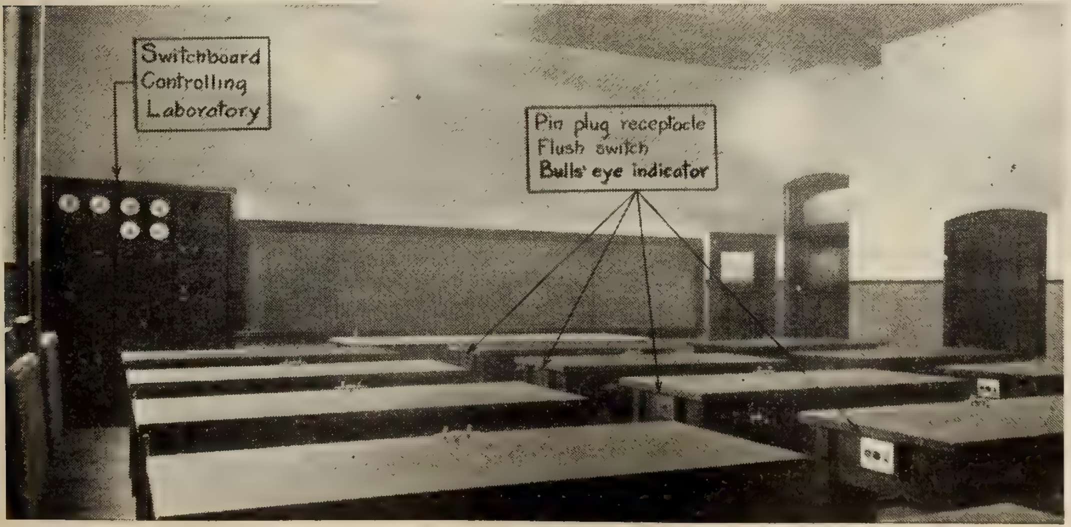
Auditorium Lighting

The auditorium lighting consisted of part direct and part indirect systems. A large skylight is located in the center of the auditorium and above this skylight were placed 500 watt reflectors mounted 3 ft. above the glass and the effect was similar to daylight and quite inconspicuous. Formerly two large chandeliers were used with 120 lamps on each fixture. These fixtures were entirely remodelled by the use of White Mazda C. tipless 50 watt lamps. The intensity was increased 50 per cent. by the use of these lamps in place of exposed lamps. The change in the appearance of this fixture by the use of these lamps was much appreciated and gave the impression of a new modern fixture. This could be done in many churches and other types of buildings to good advantage where large chandeliers are used.

The gymnasium lighting consisted of Benjamin reflectors mounted in heavy wire mesh guard on the ceiling to protect them from mechanical injury. Throughout the boiler room, manual training and fan rooms, Benjamin R.L.M. reflectors were used. The lighting in the toilets and shower rooms, consisted of vaporproof condulets mounted on the ceiling and 100 watt lamps. This unit was used to protect the lamp and socket from the moisture and vapor from the showers.

Master Control for Laboratory

The laboratory equipment for physics and chemisty is of the very best that could be obtained for this work and represents the most modern equipment installed in any building of this type to date. In the chemical laboratories every means has been provided to protect the student from the dangers of the fumes of the different chemicals used. Each student is provided with a sink of special soapstone type with hot and cold water, gas, and compressed air. The tops of the desks are special soapstone types with fume cabinets of glass. The instructor has all water, gas, compressed air and ventilation under his supervision at all times. This master control is located at the instructor's desk. The motor



Physics Laboratory of Hamilton Collegiate—Each student supplied with current from separate outlet.

to operate the ventilating fan is located with the fan on the roof. The motor is started and stopped by means of a push button and red flush bulls eye pilot lamp to indicate when the motor is operating. The Electric Controller & Mfg. Co. type Z.B. automatic starters were used for this purpose.

Separate Outlet for Each Student

The physics laboratory is provided with special electrical equipment to give students a supply of alternating or direct current from 1-250 volts according to their needs. By referring to the accompanying illustration of the senior physics laboratory the electrical outlet is shown on the side of the desk. This outlet consists of a flush type pin plug receptacle, a flush switch and an indicating flush red bulls eye lamp receptacle. Each student's outlet is controlled by a separate switch and fuse on the main switch-board to give the instructor control of each outlet so that any trouble can be traced to the student causing the same. The main switch-board to control all the physics laboratory electrical equipment is shown in the illustration. This switch-board is set flush with the blackboard, and the rear of the switch-board is protected by means of a grillwork enclosure. The direct current is obtained from two motor generator sets located in a special room in the basement. These motor-generator sets are controlled by means of Electrical Controller & Mfg. Co. automatic push botton type starters which are equipped with no-voltage and overload protection. With this equipment each student at his desk can be supplied with direct current from 1-250 volts. This is obtained by means of regulating rheostats on the switch-board. Voltmeters and ammeters of high and low scale are mounted on the board for reading the low voltage and low current. In addition to the above and by means of suitable double-throw switches each student can be supplied with alternating-current at 110 volts. A.C. voltmeters and ammeters are mounted on the switch-board for this system. Each classroom has been provided with outlets for stereopticon lanterns for lecture purposes and each one of these outlets is controlled by means of switches and fuses on the main switch-board in order to prevent any unauthorized person from tampering with the same.

Domestic Science Room—Electric Range, Hot-plates and Irons

This equipment has been designed in this manner to permit the science master to have absolute control over all electrical equipment in the laboratories. The main service equipment consists of the following:

Load Metered on Peak Basis

The service enters the building underground from the pole at the rear, 2,200 volts, 3 phase, 25 cycle. It then enters the main control room where it is protected at the entrance by means of a primary panel which consists of an automatic oil circuit breaker with overload attachment. Mounted on this panel is a polyphase integrating watthour meter and a Lincoln demand meter. The demand meter is very important on large school installations owing to the low load-factor. Before this building was rewired the total connected load was 87 h.p., after the building was rewired the connected load was increased to 147 h.p. During the month of January the peak load was 47 h.p. which was the highest peak indicated since the meter was installed. These figures show that school loads should all be metered on the peak load basis instead of the connected load. The transformers are installed in a fireproof vault. The lighting throughout the building is 3 wire, 110-220 volts, the power is 3 phase, 3 wire, 220 volts, 25 cycle.

Electric Range and Hotplates

This building has a very elaborate domestic science equipment and lunch room which includes a large electric range for the instructress and an individual electric 660 watt hotplate for each student. The full class consists of twenty-four (24) students.

The signalling equipment includes a complete telephone system and an electric clock system with a program device for announcing the different periods.

All Work Concealed Where Possible

In rewiring the building it was necessary to use rigid and flexible conduit with B.X. cable. All the work was concealed where it was convenient to do so.

Benjamin-Starrett dead front type panels were used with toggle switches throughout the building for distribution purposes.

We are indebted for the information in this article to V. K. Stalford, Consulting Engineer, Hamilton, Ont., who had charge of the design and installation work throughout.

Electric Pageing System for Hospital

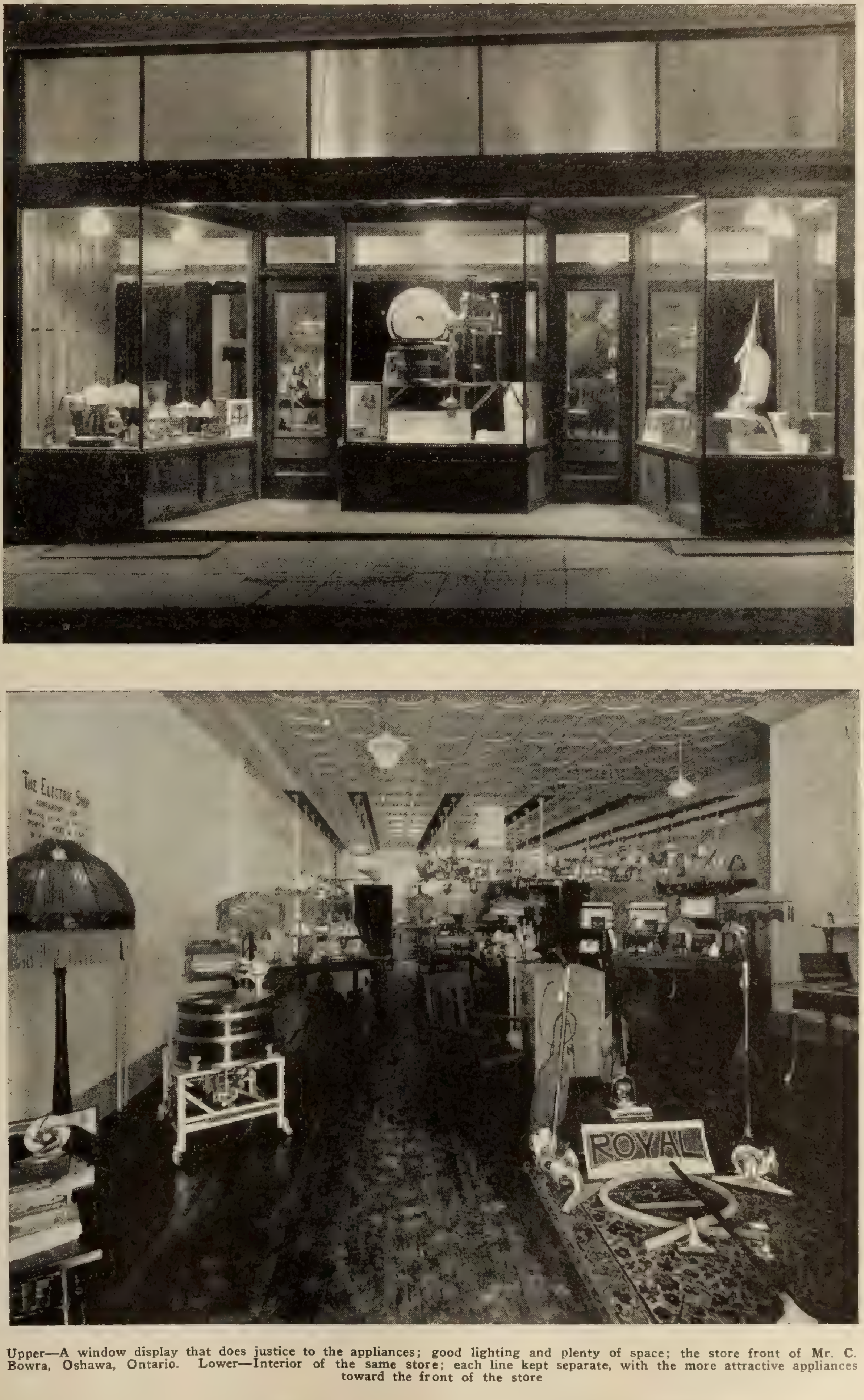
Messrs. Culley & Breay have been awarded the electrical contract for installing a doctor's pageing system throughout the General Hospital, Hamilton.

A Well Arranged Store

Mr. Charles Bowra, well known to the electrical trade, has recently opened a very fine store at 52 Simcoe St., N. Oshawa, Ont., which we illustrate elsewhere in this issue. The store, which is one of the largest in Canada being 30 ft. by 70 ft., is well stocked with a full line of electrical fixtures and appliances: also radio equipment. On the opening day tea was served; over 1,000 people passed through and made a tour of inspection. No attempt was made to sell appliances, as the large number of people made it impossible.

Secures Five Large Contracts

G. S. Whelpton, electrical contractor, Windsor, Ont., has a number of contracts at present under way, including the Ford City Separate School, Ford City Public School, Riverside Town Hall, Walkerville Baptist Church addition, and a $10,000 residence on Janette Avenue. The electrical interests in Windsor expect to be able to put an electrical home in their city in the near future.



Upper—A window display that does justice to the appliances; good lighting and plenty of space; the store front of Mr. C. Bowra, Oshawa, Ontario. Lower—Interior of the same store; each line kept separate, with the more attractive appliances toward the front of the store

It Costs More to Get New Customers Than to Keep the Old Ones*

Any contractor or dealer who will go over his books will find that there are many people who formerly patronized him who no longer are doing so. Some of these people have moved out of town. Some of them have died. There is a goodly number, however, who are still living in the community and are still in the market but are no longer counted among his customers.

There are various reasons why these customers have been lost. Some of them may not have been entirely satisfied with work that was done or an appliance that was purchased. Some of them have been attracted to other concerns. Some of them are not spending money for things electrical. They are more interested in automobiles or something else that has made a strong appeal to them.

Follow-up Necessary

In nearly all cases, however, the real reason why the customers have been lost has been due to the fact that they have not been followed up as they should. If they had been followed up in the same way that a mail order house follows up everyone who makes a purchase of even a small amount many of these customers would not have been lost. Those that are no longer greatly interested in things electrical would have continued their interest to the extent of making at least some purchases.

The easiest and cheapest way to follow up and keep in touch with customers is through the use of letters. Some of these letters may be personally written and some may be form letters. It doesn't really matter so much as long as the letters say what should be said.

Suppose a person has had a house wired, or has bought an appliance costing a fairly large sum of money. To such a person it may be well to write an individual letter. An appliance selling for less money may call for a form letter.

In either case the object of the letter is to clinch the sale. In case of the wiring job, the care with which the work has been done may be featured. Then the customer is asked if he is entirely satisfied with the work.

Asking if the work is entirely satisfactory without first pointing out the effort that has been put forth to make it satisfactory may cause the customer to look for defects. As a matter of fact such letters do sometimes bring forth complaints that are apparently made because the letter seems to present an excuse for making them.

Object of the Letter

The object of the letter is not to give such an excuse but to show the customer how much effort has been made and is being made to please him and that his business is being appreciated. This means that it must tell the customer what has been done for him.

Such a letter not only makes the customer feel better but it frequently causes him to pay his bill sooner than he otherwise would and when this is accomplished the letter has paid for itself nothing more comes of it. Showing a real interest in the customer means that he will take a greater interest in the contractor.

There are a great many people who have bought electrical appliances and have not been completely sold. That is they do not use these appliances as much as they should. They do not get the electrical habit and this hurts future sales.

Points for a Follow-up Letter

This is one reason why every appliance sold should be followed with a letter. It doesn't cost much to mail the letter and it may result in many more sales to that customer which otherwise would not be made.

Such a letter should point out the good features of the appliance. These features may all be pointed out in a booklet or circular of instructions that goes with the appliance but the letter will emphasize these points.

After these points have been taken up give a few brief directions in regard to its use, especially the different ways in which it can be used. Then touch upon its care and any service that will be rendered in relation to the appliance.

Sometimes the sale of an appliance opens the way for more wiring. When a person has purchased a vacuum cleaner, a sewing machine motor or an electric iron one or more base board outlets may be needed in order to increase the convenience of that appliance.

A letter following the sale of the appliance featuring the advantage of these additional outlets may lead to having the work done, whereas, if no letter has been written, perhaps these outlets would never be given serious consideration. If the actual cost of having the work done can be given in the letter the chances of making the sale are increased just that much.

Keeping in Touch with the Customer

The lettters that follow up the sales, however, are not so valuable from the point of view of making additional sales as they are from the point of view of keeping in closer touch with the customer. They make the customer feel that the contractor or dealer is taking a real interest in him, desires to give him thorough satisfaction and causes him to hesitate about taking his patronage elsewhere.

Holding customers is just as important as increasing their sales because it is cheaper to hold a customer than to secure a new one to take his place. In fact a customer that is held automatically means new customers for the reason that a satisfied customer will advise his friends to patronize his contractor or dealer. He will act as a salesman without pay.

On the other hand a customer lost will not send around a new customer to take his place. The chances are that he will use his influence to keep his friends from trading with that contractor or dealer.

Holding customers, therefore, means very much more than retaining the custom of present customers. It means increasing the volume of business and the number of customers at the lowest possible cost. It means more profit and it often means that better values can be given for the money spent by customers.

Customers cannot be held, however, that is the maximum number of them cannot be held by merely following each appliance or contract with a letter. It is necessary to keep in touch with them between contracts and sales.

Secure Names and Addresses

Most people who come into a store and make a purchase are willing to give their names and addresses if they are told that the firm desires to keep them informed in regard to new things and special bargains. People who have made one purchase are much easier to sell to, than those who have never made a purchase. They have already shown their confidence in the store.

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*R. Falconer in Central Station.

A mailing list made up of people who have patronized the concern is a much more effective list than one that can be compiled in any other way. It is a very select list and more money can profitably be spent upon it than could be spent on a more general list containing many names of people to whom it would be almost impossible to sell.

Even though the initial purchase is small it will probably pay to spend a few dollars a year in following up that customer with letters. Every month, every three months, or at most every six months a letter may be mailed calling attention to appliances or service. New things may be brought to the attention of the customer, a new line of stock or anything else that can possibly be of interest.

Then again when there is an overstock of anything and it is necessary to move it, there is no need of waiting until a sale can be put on or until the stock will sell in the usual course of business in order to move it. The price on this surplus stock can be reduced and the fact brought to the attention of the customers. The customers get the bargains. Usually they appreciate this and show their loyalty to the concern by buying more and more there.

One great advantage of letters is that just the people it is desired to reach can be reached.

Surplus May Be Disposed Of

If a few more motors of certain size than it is wise to carry in stock are on hand, letters can be mailed to the people who are most likely to be interested in such motors, who can use them, and the stock be disposed of quickly and quietly.

In this way letters can be used not only to keep in close touch with the customers and to hold their trade but also to speed up the rate of turnover, because a flock of letters will dispose of any small surplus much quicker and much cheaper than it can be done in any other way. It is just a matter of writing in them exactly what you or your salesmen would say to them if they were talking to you face to face and hand only three minutes to deliver their message.

Radio Bakes Bread

Out in Muncie, Ind., recently food show experts baked a loaf of bread by radio. The actual baking was done by an electric heater, but the heat was controlled, turned off and on, by radio.

Exhibit of Canadian Cleveland Farebox Co., at C.E.R.A. Convention

Trade Publications

The A. C. Gilbert-Menzies Company, 439 King Street, W., Toronto, are distributing a new catalogue of radio apparatus. This publication is printed in two colors, and plenty of space is devoted to each article. Several types of tube and mineral sets are described, as well as accessory apparatus. The catalogue includes a letter from a Manitoba fan, describing some interesting results achieved with Gilbert radio instruments.

Mine Apparatus

The Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has just completed the preparation of a 64 page illustrated publication on mining apparatus. In addition to line material, the publication, which is known as Catalogue 6-M, contains much information about mine safety switches, Frankel solderless connectors, tapes, babbitts, solders, micarta gears, mine locomotives and mine locomotive headlights.

New Electric Power Handbook

The Electric Power Club (Kirby Bldg., Cleveland) has issued a new addition (14th) of its handbook—covering substantially all the standardization it has effected in electric motors, motor pulleys, generators, transformers, electric tools, mining and industrial locomotives, control equipment, power switch-boards and switching equipment manufactured in this country. The handbook also contains definitions, symbols, general engineering, recommendations and other information needed by users and purchasers of electric power apparatus and control equipment. Single copies will be given without charges, to consulting engineers, architects, electric light and power companies, rated electrical contractors and educators—otherwise the charge is 50 cents per copy. At the last annual meeting of the Club the privilege of membership was extended to Canadian manufacturers.

Come to the Convention, Nov. 13 and 14.

Fergurson, Pailin Ltd., Enter Canadian Field

Another indication of the increasing interest of British firms in the Canadian field is shown by the announcement that Messrs. Ferguson, Pailin Ltd., of Manchester, England, are opening a Canadian office and warehouse. In a short time it is the company's intention to start manufacturing here and turn out entirely Canadian-made products.

Messrs. Ferguson, Pailin Ltd., manufacture switch-boards and switching equipment. This company was formed many years ago to take over the switch-board and switch gear end of the Ferranti business, and since that time have been manufacturing those lines discontinued by Ferranti.

In entering the Canadian field the British firm has entrusted its interests here to an engineer of wide experience on both continents—Mr. Herman K. Ansingh, who was formerly chief switch-board and switching equipment designs engineer of the British Westinghouse Co. and until recently has been switch-board and equipment designs engineer for the Westinghouse Electric and Manufacturing Co., at Pittsburgh. He is a member of the American Institute of Electrical Engineers and an associate of the Institution of Electrical Engineers.

Ferguson, Pailin Ltd., have just recently received an order from the Ontario Hydro-electric System for nineteen 400,000 kv.a. rupturing capacity, oil circuit breakers. Their Canadian headquarters will be at 321 King St. East, Toronto.

Montreal Contractor-Dealers Take Steps to Have Licensing Act Enforced

Last April, about the time of receipt of a charter from the Provincial Government, the electrical contractor-dealers of the Province of Quebec reorganized their association, contracting on the basis it should have been on long ago, in keeping with opportunities offered and their obligations as a part of the country's most essential industry. It would be hardly an exaggeration to say, that if just a part of the monetary expenditure, energy and serious effort spent during the past year or so by a few of the contractors of Montreal and the Co-operative Association of the Province of Quebec, to improve the electrical contractor's position and business, were applied in any other more homogeneous community, results of considerable value would have been undoubtedly achieved. As it is, one may truthfully say that certain improvement in their organization has been accomplished; that there is a considerably larger number of contractors realizing the necessity and value of a strong and influential organization, as compared with even a few months ago, and that most of them feel that they, as a branch of the industry, **"are getting there."**

And, after all, most of the existing evils, hampering the proper development of industry, depend solely on organized effort and honest, sincere co-operation.

Enforcement of Licensing Act Required

Before any real progress and actual results can be expected a few urgent matters of immediate importance must be attended to locally, some of which are not within the power of the contractors themselves to adjust, although with the help of a strong organization their accomplishment could be decidedly hastened. The most important of them is the proper enforcement of the Provincial Licensing and Inspection Act, which was procaimed about twenty-six months ago. It would perhaps be unfair to state that this Act is being put into practice with the same speed as the results are achieved in curing the deadly sick Europe through the Genoa, Hague, London, and too-numerous-to-mention other conferences, but it is nevertheless slow enough to allow the electrical contractors of the Province and especially of Montreal to garner barely 15 to 20 per cent. of the large crop of wiring contracts and numerous other incidental jobs, available through this year's very extensive building activities in the Province of Quebec. Most of the work is still done by men who are neither contractors nor electricians in the true meaning of these words.

Such condition is not only a source of business worry to the contractors but also a great handicap towards proper development of their association, which, despite all, is trying and feels that it is slowly, but surely "GETTING THERE." If action could be as easily and quickly gotten from Governments and Government officials as promises are, we ...., but why talk of the millenium for a few centuries yet?

Act Will Eliminate Undesirable Element

The proper enforcement of this act, which everybody hopes before long, is eventually bound to be attended to, will eliminate a large number of most undesirable elements posing as and encroaching on the field of the real electrical contractor.

With the disappearance of probably 60 per cent of men undertaking electrical work to-day, through the application of the Act, business failures and education of the public that their comfort, economy, protection of property and life depend on the work being done by a specialist, as far as the electrical installation is concerned, one does not need to be an optimist to visualize the improvement in the electrical contractor's business and the industry at large, but two things should be well borne in mind:—an old Japanese proverb that **patience and mulberry leaves become a silk gown,** and above all that **"things don't turn up, they must be turned up."**

To help matters along the Contractor-Dealers Association inserted in five of the Montreal dailies the following advertisement:

Electrical Contractor-Dealers Association

Province of Quebec, Incorporated

calls attention of Architects, Builders and the public at large to the meaning of the Provincial Licensing and Inspection Act, II. George V., Chapter 75.

"any electrical work at the installation of wires, conduits and apparatus for the transmission of electricity for producing heat, light or motive power in this Province can be undertaken **only by a licensed electrical contractor, employing licensed electricians."**

This Act is now in force and work undertaken by others than licensed contractors and done by non-licensed electricians is liable to be stopped by the Government Authorities. Only licensed electrical contractors are members of this Association, and are provided with proper membership cards in proof thereof.

For further information, please, apply to the Association's Headquarters, 65 McGill College Avenue, Montreal, P. Q.

From reports, this advertisement, although it appeared only once in each of the five papers spread over two days had certain effects on general building contractors and architects in ascertaining if those to whom they are giving the electrical work are licensed contractors. At least two cases are known where contracts for wiring were given shortly before the appearance of this advertisement to non-licensed men and were cancelled for fear that their work may be stopped by the Government officials and inspection certificate refused by the Underwriters, as the latter are co-operating with the Government and the Contractor-Dealers' Association in enforcing the Act.

Branch No. 2 of the Association, consisting of the English speaking contractors in Montreal, have been busy for the past few weeks on the preliminary work in connection with their fall and winter programme.

Committees Appointed

The following committees were appointed and are already at work:—

Educational: (elementary theoretical and practical course for apprentices and wiremen) Chairman, L. T. Mead, C. Langston and R. C. Barrett. This Committee is arranging with the Montreal Technical Institute for night courses for apprentices and wiremen; it is also intended to have practical demonstrations given to the wiremen by some who are known to be good mechanics, how the many details of proper wiring should be done.

Cost and Accounting: R. S. Muir, Chairman, H. Vincent, P. G. McQuaig. This Committee has as its object to arrange for meetings at which experiences of figuring overhead, cost, turnover, etc., will be discussed and compared, and probably a uniform and adequate form for calculating tenders will be adopted.

Minimum Wage: J. A. Anderson, Chairman, F. J. Parsons, L. A. Mace. The work of this Committee consists of working out and submitting scale of wage for adoption by all the members of the Association both for the journeymen and the apprentices and helpers. It is hoped by this means to stabilize the great variation in the existing scale of wages and to attract a proper type of men into the electrical work, of whom great lack is felt just now.

Complaints: E. J. Gunn, Chairman, A. Bell, M. R. Henry. Complaints of breach of code of business ethics, unfair competition on the part of members, and others in the industry who are not supposed to encroach on the field of the contractor's merchandising activities, will be investigated by that Committee before being submitted to the Association for action.

Membership: D. C. Smith, Chairman, C. Booth.

Electrical Homes: R. C. Barrett, Chairman, M. R. Henry, E. C. Gregory. The duty of this Committee is to and have been gradually heading towards putting electrical enlist assistance of as many contractor-dealers members of the Association and their staff to act as attendants at the Electrical Homes Exhibits as possible, and to see to it that those who promise to act are assigned the proper duties and days.

It is strongly felt by the contractors who, during the past winter, served as attendants at the Electrical Home, that no better practical school of salesmanship could be thought out than the direct contact with the visitors in a home.

It is expected during the coming winter to have also organized appliance and fixtures dealers sections, of which there is a great need and a large scope for organized efforts.

Third Electrical Home for Montreal

The city of Montreal will open to the public on September 16th another "Modern Electrical Home", which will close on October 7th. This is the third educational exhibit arranged by the Electrical Co-operative Association, Province of Quebec, and the second during the present year.

Montreal continues to carry on the Electrical Home Campaign not because it is a seasonal fad, but because all the branches of the industry earnestly believe and have satisfied themselves that it is a most efficient and economical means of educating the public to the wider use of electricity. Besides, it actually demonstrates advantages derived from proper and adequate wiring of houses, has considerable and beneficial influence over the homeseekers and builders, at the same time giving an opportunity to the contractor-dealers and their staffs to come in contact with many prospective clients and to educate themselves in indirect salesmanship.

Opening of Home

The Home to be opened on September 16th. is located at 323 Wilson Ave., just above Cote St. Antoine Road, a little over a block from a street railway stop.

Notre Dame de Grace district, where the home is located, is essentially a residential part of the city, consisting of medium sized and priced houses, the bulk of which are owned by the occupants. The building programme of that district this year and for the next two or three years, is probably the most extensive of any part of the city, which in itself is an advantage. The house used for the Electrical Home is one of some twenty built this year by the Lancashire Land Construction Company, which has wired a number of the houses according to the plans prepared by the Wiring Committee of the Co-operative Association, and which appeared in the Electrical News of August 15th.

The present home has the advantages of location and season over the previous one and a considerably larger attendance is expected.

Features of House

The lay out of the house itself lends better to such a purpose; besides, the illumination both interior and exterior, the furnishings and equipment will be more carefully attended to. Several new features not available for the previous Home will be included in this one, which will add to the attraction. Among them are electrical dining and bed room sets, the first ones of the kind manufactured in Canada; the Gibbard Furniture Company of Napanee, Ont., on representations made to them by the Co-operative Association, have decided to make up the first electrical set of furniture, which will forcibly impress upon the visitors the advantage of a sufficient number of convenience outlets properly placed in the rooms not only to derive comfort but also to enable the rearrangement of furniture in the rooms to suit the fancies of the ladies.

Another improvement will be the placing of a radio receiving set in the adjoining house, the idea being not to interrupt the traffic in the Electrical Home itself and not to distract the attention of the visitors—where both concerts and full explanations of the working of this latest invention will be afforded to the public.

The Committee which has the electrical Home in hand is as follows:

Financial: C. F. Medbury, Can. Westinghouse; W. O'Brien, Montreal Light, Heat & Power; M. K. Pike, Northern Electric Co; J. W. Pilcher, Can Gen. Electric; N. Simoneau, President, Electr. Contractor-Dealers Assn.

Illumination: G. E. Jacquet, Mitchell-Holland; L. A. Kenyon, Montreal Light, Heat & Power; L. H. Marrotte, Public Service Corporation; Geo. McDougall, McDougall, Pease & Friedman, Cons. Engineers; Fred Parsons, MacDonald & Willson; J. Rosenthal, Can. Electrical Supply; L. V. Weber, Jefferson Glass.

Appliances: C. D. Slimpin, Montreal Light, Heat & Power; Geo. L. Atchison, Southern Canada Power Comp.

Advertising and Publicity: C. E. Fortier, Bell Telephone Comp.; N. L. Engell, Public Service Corporation; G. R. Allerton, Northern Electric; C. D. Slimpin, Montreal Light, Heat & Power.

House Committee: C. D. Slimpin, Montreal Light, Heat & Power, Chrmn.; G. Atchison, Southrn. Can. Power, Vice-chrmn.; N. W. Fairlie, Monarch Elec. Comp.; H. Lee Jones, Can. Gen. Electric; J. A. Anderson, contractor-dealer; C. Barrett, contractor-dealer; E. A. Gregory, contractor-dealer; M. L. Henry, contractor-dealer; J. A. St. Amour, contractor-dealer; J. N. Tremblay, contractor-dealer; E. C. McGovern, Northern Electric; W. Parke, Renfrew Electric; N. Clarke, National Heating Appliance; H. Vincent, Electrical Contractor; M. W. Farthing, Bell Telephone.

The Co-operative Association has also under consideration a plan to open to the public during the coming winter and early spring an electrically equipped home where, twice a week, actual demonstration of the various appliances would be given by experts. There is no doubt that once the women became educated to appreciate the value of the many electrical appliances, and the electrical contractor-dealers learn to be better salesmen than they are just yet, the business from the merchandising point of view as well from the point of augmented power sales will be marked. In the meantime, however, this campaign remains purely educational and everybody is expected to take as broad a view of his part in it as the original idea of the "Electrical Home" Campaign was from the outset.

A Permanent Exhibit

In the office of the Co-operative Association at 65 McGill College Ave., there will be installed a compact and complete exhibit of electrical supplies, which will be accessible to the architects at all times.

With the considerably increasing building activities such an arrangement should prove to be of benefit to both parties and to the public at large.

Copies of the suggestion for properly wired houses are also sent to all persons taking out building permits and are distributed among the builders.

The number of inquiries and requests for the plan by persons interested from a practical point of view which are received personally and by mail in the office of the Association, despite a very scant publicity as yet, are the best proof that people are ready to be educated as to what is required in the matter of electrical installation to make their houses fully modern.

Other speculative builders gradually will have to follow for purely competitive reasons; besides, prospective buyers of houses and tenants will demand better wired dwellings.

The greatest difficulty, however, is being experienced in having the electrical contractor-dealer become, if not a real, then at least a half salesman—to be something more than a mere wireman satisfied with accepting a contract for putitng in electrical installation according to suggestions or orders of an owner who is ignorant or ill-informed as to how the house should be wired; in making him use business arguments and business language in selling his knowledge and his skill in what is right and what is wrong, what is obsolete and what is modern, in an electrical installation of a modern house.

The Electrical Contractor-Dealers' Association, Province of Quebec, Inc., is already getting ready an educational plan for their members during the next fall and winter which eventually is bound to accomplish its aims.

Canadians Qualified for Hoover Convention

At the beginning of the present year the Hoover Suction Sweeper Co., of Canada Ltd., allotted to each Canadian district manager a fixed number of machines on condition that if he sold them within a certain specified time he would get free passage to the Hoover "Go-Getter" convention, which was held at Hoover camp, North Canton, Ohio, commencing August 2nd., 1922. We are advised that six Canadian district managers have qualified as follows: J. B. Fleming, district manager for the Maritime provinces, located at Halifax, N. S.; J. F. Paxton, district manager for York County, located at Toronto, Ont.; W. D. Booker, district manager for South Eastern Ontario, located at Hamilton, Ont.; G. T. White district manager for South Western Ontario; Wm. Crawford, district manager for the province of Manitoba, located at Winnipeg, Man.; P. T. Brinsmead, district manager for the province of Saskatchewan, located at Regina, Sask.

Personal

Messrs. E. Thinel and W. A. Dagenais, both energetic, experienced electricians, have opened up business at 402 Wellington Street, Ottawa. Under the name Electric Heating and Contracting Co., they will manufacture the Capital unbreakable hot plate; also make installations and repair all kinds of electrical equipment,

"Never lost a customer in ten years" is claimed by Stewart & Morkin, electric motor experts, London, Ont. This business, that has been in existence more than ten years, has been built up on the policy of efficiency and service. A fully-equipped workshop on Fullarton street, with a large staff of experts, enables this firm to do any kind of work on electric motors, besides handling the Bosch magneto service for the city.

Messrs. L. Price and J. Hawke, proprietors of the Auto Electric Service, London, Ont., have recently taken over the Western Ontario agency for the Auto Lite, Delco, Remy and Connecticut electrical appliances and conduct the official service station in London for the firms manufacturing these units. This firm find their larger quarters at 38 King Street are a great help in handling their increased business.

Retailer-Jobber Relations

"The great need of the Electrical Industry today is the development and maintenance of dealer prosperity. This cannot be done on low prices and narrow margins. We are telling our dealers that their most important duty is to give service—real service that will sell goods. If they are going to do this, they must have a gross profit large enough to pay the cost. In other words, it costs money to sell goods, and this means a sufficient profit must be made."

"The sizing-up process carried through by the jobber's salesmen goes much farther than the retailer's credit standing. The latter himself must be analyzed. How is he regarded by the community at large? Is he popular personally? Does he make himself felt in local civic and commercial enterprises having as their object the good of the community as a whole? Is the atmosphere of his store friendly and pleasing? Does the way he advertises seem to indicate that he understands advertising as a business-building force?"

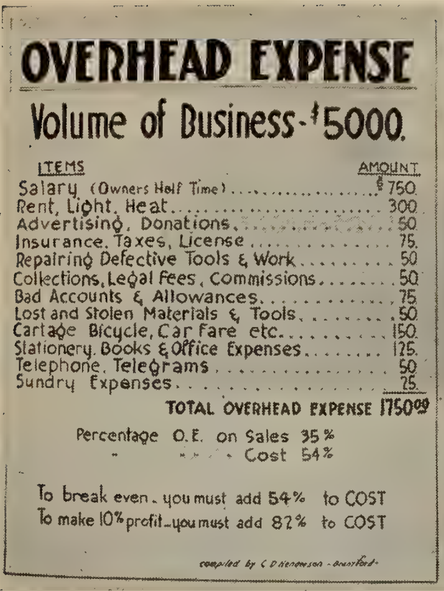
"Is the retailer of a type that will "grow" with the company? His size at the time does not count. He may be the town's largest dealer in his line or the smallest. But is he willing to be taught and helped? Is he capable of future development along the generous lines contemplated by the jobber's plan? In short, will he work with the jobber and permit the jobber to work with him to the end that a business profitable to both, shall be built up."

Home Building and Appliance Sales go Hand in Hand

Building activity and possibilities for appliance sales go hand in hand. Right at the present time there is more home building in progress than there has been for a long time past. It is easy to put two and two together.

Building expositions, own-your-home shows, better-home exhibits are being held in many cities. These shows are nothing more or less than advertisements or, if you please, suggestions to people to build. And the point is that people are building.

If a building show is a good advertisement for individuals and companies that are interested in furnishing material for new homes, it is certainly a good place to advertise the electrical appliances that do so much to make the home comfortable,



OVERHEAD EXPENSE

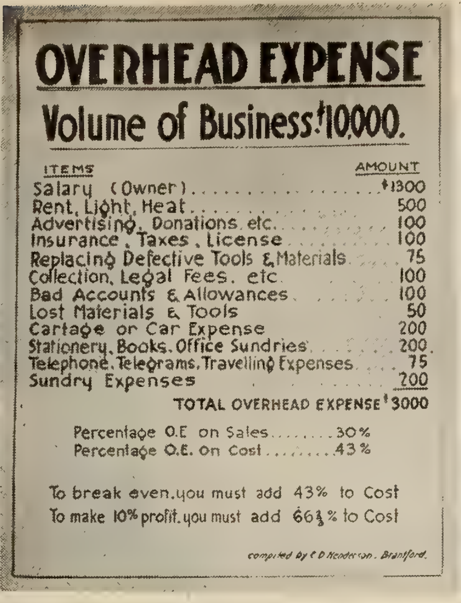
Volume of Business-$5000.

ITEMS	AMOUNT
Salary (Owners Half Time)	$750.
Rent, Light, Heat	300.
Advertising, Donations	50.
Insurance, Taxes, License	75.
Repairing Defective Tools & Work	50.
Collections, Legal Fees, Commissions	50.
Bad Accounts & Allowances	75.
Lost and Stolen Materials & Tools	50.
Cartage Bicycle, Car Fare etc.	150.
Stationery, Books & Office Expenses	125.
Telephone, Telegrams	50.
Sundry Expenses	75.
TOTAL OVERHEAD EXPENSE	1750^{00}

Percentage O.E. on Sales 35%
" " " Cost 54%

To break even - you must add 54% to COST
To make 10% profit - you must add 82% to COST

compiled by C D Henderson - Brantford -



OVERHEAD EXPENSE

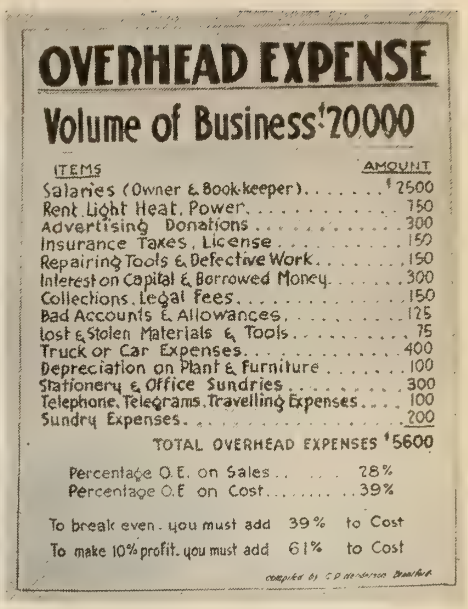
Volume of Business $10,000.

ITEMS	AMOUNT
Salary (Owner)	$1300
Rent, Light, Heat	500
Advertising, Donations etc.	100
Insurance, Taxes, License	100
Replacing Defective Tools & Materials	75
Collection, Legal Fees, etc	100
Bad Accounts & Allowances	100
Lost Materials & Tools	50
Cartage or Car Expense	200
Stationery, Books, Office Sundries	200
Telephone, Telegrams, Travelling Expenses	75
Sundry Expenses	200
TOTAL OVERHEAD EXPENSE	$3000

Percentage O.E on Sales........30%
Percentage O.E. on Cost.........43%

To break even, you must add 43% to Cost
To make 10% profit, you must add 66⅔% to Cost

compiled by C D Henderson, Brantford.



OVERHEAD EXPENSE

Volume of Business $20000

ITEMS	AMOUNT
Salaries (Owner & Book-keeper)	$2500
Rent, Light Heat, Power	750
Advertising Donations	300
Insurance Taxes, License	150
Repairing Tools & Defective Work	150
Interest on Capital & Borrowed Money	300
Collections, Legal Fees	150
Bad Accounts & Allowances	125
lost & Stolen Materials & Tools	75
Truck or Car Expenses	400
Depreciation on Plant & Furniture	100
Stationery & Office Sundries	300
Telephone, Telegrams, Travelling Expenses	100
Sundry Expenses	200
TOTAL OVERHEAD EXPENSES	$5600

Percentage O.E. on Sales ... 28%
Percentage O.E on Cost.........39%

To break even - you must add 39% to Cost
To make 10% profit - you must add 61% to Cost

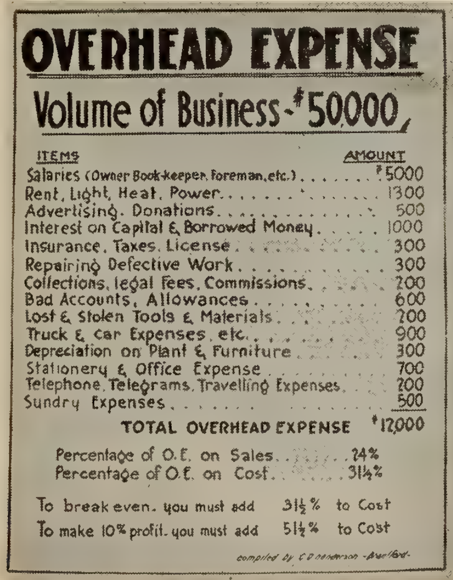
compiled by C D Henderson Brantford

O-V-E-R-H-E-A-D!

A few weeks ago C. D. Henderson of Brantford gave the electrical contractors down in the Niagara district a talk on "Overhead." This is something Mr. Henderson has made a close study of, and the charts he has worked out, some of which are reproduced on this page, were at the same time an education and an inspiration to the electrical fellows down in the fruit district. J. H. Sandham, who handles a camera almost as well as he does a wiring job, sent the Editor these pictures of Mr. Henderson's cards. It was very thoughtful of him and we all appreciate it.

Note that the figures have been worked out for four different turnovers viz; $5,000, $10,000, $20,000 and $50,000. Study very carefully that long list of expenses:—every one of them is a fact. To make a 10 per cent. profit you have to add 82 per cent. on cost, on a $5,000. turnover. If you only add 54 per cent. you make no profit. If you add less than 54 per cent. **you are losing money.**

An interesting point, which is prominently brought out by the charts, is the fact that overhead goes down with the volume of business. The smaller business has not as many items as the larger ones but has a greater total in regard to the volume. This fact is known beyond question, but it is still possible, to run across a man in a small way of business who makes no calculation of overhead expense. It seems a silly question to ask any business man if he is sure he is making a profit. We all know of a number of instances, however, where dealers appeared to be prosperous—looked prosperous, acted prosperous, thought they **were** prosperous and yet, in the course of a few years, went to the wall. The "business mortality" rate is high and the reason is mainly that expenses and profits are figured incorrectly. Don't do business at a loss. There is no pleasure in it and **nobody thanks you.**



OVERHEAD EXPENSE

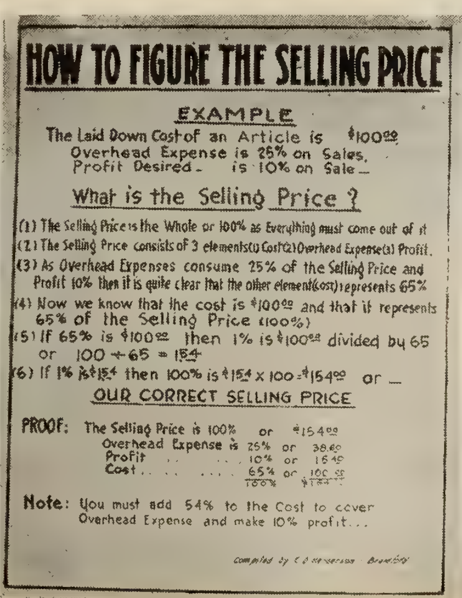
Volume of Business-$50,000,

ITEMS	AMOUNT
Salaries (Owner Book-keeper, Foreman, etc.)	$5000
Rent, Light, Heat, Power	1300
Advertising, Donations	500
Interest on Capital & Borrowed Money	1000
Insurance, Taxes, License	300
Repairing Defective Work	300
Collections, legal fees, Commissions	200
Bad Accounts, Allowances	600
Lost & Stolen Tools & Materials	200
Truck & Car Expenses, etc.	900
Depreciation on Plant & Furniture	300
Stationery & Office Expense	700
Telephone, Telegrams, Travelling Expenses	200
Sundry Expenses	500
TOTAL OVERHEAD EXPENSE	$12,000

Percentage of O.E. on Sales........24%
Percentage of O.E. on Cost.........31¼%

To break even - you must add 31½% to Cost
To make 10% profit - you must add 51½% to Cost

compiled by C D Henderson - Brantford -



HOW TO FIGURE THE SELLING PRICE

EXAMPLE

The Laid Down Cost of an Article is $\$100^{00}$
Overhead Expense is 25% on Sales.
Profit Desired - is 10% on Sale -

What is the Selling Price ?

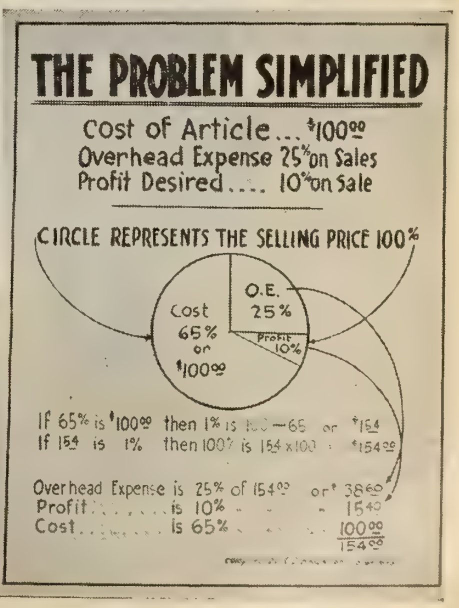
(1) The Selling Price is the Whole or 100% as Everything must come out of it
(2) The Selling Price consists of 3 elements (1) Cost (2) Overhead Expense (3) Profit.
(3) As Overhead Expenses consume 25% of the Selling Price and Profit 10% then it is quite clear that the other element (cost) represents 65%
(4) Now we know that the cost is $\$100^{00}$ and that it represents 65% of the Selling Price (100%)
(5) If 65% is $\$100^{00}$ then 1% is $\$100^{00}$ divided by 65 or 100 ÷ 65 = 1^{54}
(6) If 1% is $\$1^{54}$ then 100% is $\$1^{54}$ x 100 = $\$154^{00}$ or -

OUR CORRECT SELLING PRICE

PROOF:

The Selling Price is	100%	or	$\$154^{00}$
Overhead Expense is	25%	or	38^{60}
Profit	10%	or	15^{40}
Cost	65%	or	100^{00}
	100%		$\$154^{00}$

Note: You must add 54% to the Cost to cover Overhead Expense and make 10% profit...



THE PROBLEM SIMPLIFIED

Cost of Article... $\$100^{00}$
Overhead Expense 25% on Sales
Profit Desired..... 10% on Sale

CIRCLE REPRESENTS THE SELLING PRICE 100%

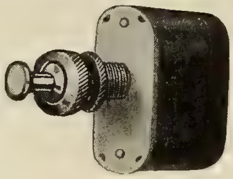
If 65% is $\$100^{00}$ then 1% is 100 ÷ 65 or $\$1^{54}$
If 1^{54} is 1% then 100% is 1^{54} x 100 = $\$154^{00}$

Overhead Expense is	25% of 154^{00} or	$\$38^{60}$
Profit	is 10% " " "	15^{40}
Cost	is 65% " " "	100^{00}
		154^{00}

The Latest Developments in Electrical Equipment

Utility Automobile Switch

The Benjamin Electric Manufacturing Co., 11-17 Charlotte Street, Toronto, Canada, are handling the sale and manufacture of a new switch, designed for the dash control of automobile lights, particularly additional lights such as "courtesy" and double lamps. The product is known as the "C-H utility Automobile Switch" and was originated by the Cutler-Hammer Manufacturing Co.; it is provided with a quick make-and-break mechanism which it is claimed is not affected by the vibration of the car. The switch is operated by means of a nickel-plated push-and-pull button. When installing, it is necessary to drill only one hole in the dash, insert the switch stem and tighten a lock nut. Lock washers are provided for both sides of the surface on which the switch is installed, thus permitting the securing of the switch to different thickness of metal or wood.

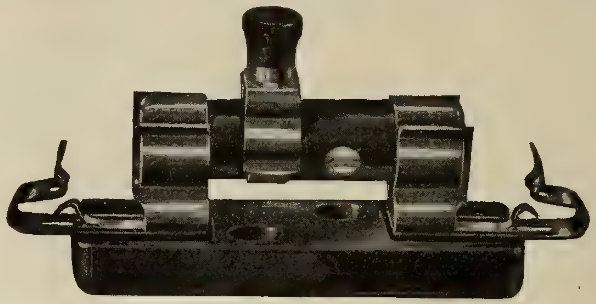


Locomotive and Crossing Bells

A line of locomotive and crossing bells has been placed on the market by the Thomas Smith Company, Canton, Ohio. The type illustrated can be supplied for voltages from 6 to 650, either a.c. or d.c. Current-carrying parts are insulated from the casing by a slate base and porcelain bushings. The bell itself is made of cast steel or bell metal and has a coppered finish. It is claimed that the bell fastening is theft-proof, and permits inspection while in operation. The mechanism is motor-driven, and it is said that all the wearing parts are hardened and ground.

Lightning Protector and Pull Switch

A lightning protector offered by the Fernando C. Mesa Company, Irvington, N. J., meets those requirements for radio apparatus which specify that aerials be grounded at all times when radio apparatus is not in use, except in sets used for receiving only, when the ground switch may be replaced by an approved type of lightning arrester. It is claimed that the protector can be left permanently connected in the circuit without detracting from the signals received.

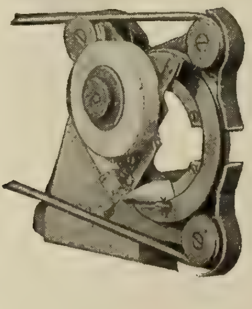


Combination Waffle and Pancake Iron

The Majestic Electric Development Company, San Francisco, Calif.,have recently placed on the market a combined waffle and pancake iron, which is electrically heated. It is claimed that no grease is required and hence no smoke or odor is created. The device consumes 660 watts and is furnished with Marsh Patent Licensed wire. Attachments include a plate warmer top, special folding handle, and aluminum double duty plate. It is sold complete with heater cord, on-and-off switch and separable plug.

Armature Coil Taping Machine

A self-feed armature coil taping machine has been brought out by the P. E. Chapman Electrical Works, St. Louis, Mo. It is furnished singly or with motor drive as desired. The manufacturers claim that the self-feed is a simple device with no gears, cams or belts, and requires no "setting up" for a job. The operation of the machine is about the



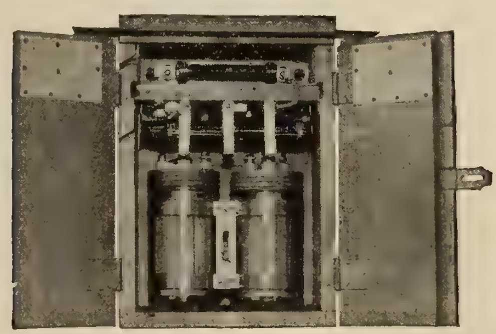
same as that of a plain taping machine, but is said to be easier. The feed can be varied to obtain a variety of laps and the pull of the tape is taken off the operator to such an extent, it is claimed,—that the coil can almost be allowed to lie in the operator's hands while taping

Vertical Wire Clamp

The problem of attaching a vertical wire to a common line insulator and keeping the latter in correct position, is claimed by the States Company, 19 New Park Ave., Hartford, Conn., to have been solved with their "Thesco" clamp. This device fits standard insulators and it is claimed to cut the energy losses of distribution by keeping down a leakage from the conductor to the insulator pin. The clamps are made of malleable iron, galvanized by the hot dipping process. Both halves are alike and interchangeable. The manufacturers claim that these clamps will not break the glass, as there is but one bolt and the covering of the conductor receives the pressure that may result from unequal expansion.

Direct-Current Lightning Arrester

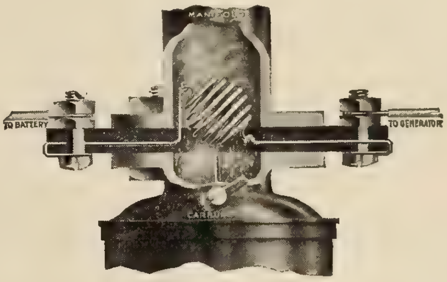
A direct current electrolytic lightning arrester, for voltage applications up to 3,800 volts has been recently developed by the Westinghouse Electric & Manufacturing Company. The device contains one to twelve cells and is designed for car or station use on railway, power and lighting circuits. The construction embodies two aluminum plates immersed in a suitable inorganic electrolyte and supported from a porcelain cover clamped by a zinc ring to a glass jar with a gasket placed between the porcelain cover and the glass jar.



Hollow concentric cylinders made from sheet aluminum form the plates, the outer cylinder or plate being punched and upset at frequent intervals in order to allow free circulation of the electrolyte within the cell. Balancing resistors are used with arresters of more than one cell. The arresters are "floated" between the line and ground, so that a leakage current of only a few milliamperes passes continually. This leakage current serves to keep the film upon the aluminum plate or plates in proper order. The device is capable of passing a surge current of approximately 1000 amp. at double normal voltage when the arrester is functioning and one arrester should be used for each 500 kw. of feeder bus, rotary converter or motor-generator capacity to which the arrester is connected. Any voltage in excess of normal line voltage is discharged promptly through the arrester. The arresters are mounted and securely held in asbestos board and wool-fibre-lined cypress boxes.

Fuel Electrofier

The Bukolt Manufacturing Company have recently placed on the market a device for heating and vaporizing gasoline fuel by means of electric heat before it reaches the cylinder. It is claimed that this is accomplished by means of a heat coil of special material which produces heat at the least resistance. The cut depicts the arrangement of the apparatus which includes a wire ball forming a screen through which the fuel must pass. This ball is heated red-hot and transforms the liquid into gas ready for explosion under cylinder pressure. The heat coil is placed and connected in between the carburetor and manifold on the charging line between the generator and battery.



Favor 12 Gallon Tank as Standard

The idea of standardizing on a 12 gallon tank for electric homes, suggested in a recent issue by Mr. S. H. Excell of Vernon, B. C., has met with considerable favor. Here are a couple of letters from electric merchants:

Ottawa, Aug. 11.

Editor Electrical News,

Regarding H. S. Excell's suggestion for 12 gallon water tank for household use. We are of the opinion that the 12 gallon tank would be more advantageous from an economical point of view, and would give enough hot water for ordinary every day use. It would also lower the cost of installation. Standardizing on the 12 gallon electrically heated water tank would be a step in the right direction.

Yours truly,
P. E. Marchand

Toronto, Aug. 3.

Editor Electrical News:—

We are quite in accord with Mr. Excell's suggestion that a 12 gallon water tank is ample for the average medium household and we would like to see the trade standardize on a smaller tank.

Yours very truly
Taylor Bros.

Current News and Notes

Bright, Ont.

Hydro power was turned on here for the first time recently. The streets are not lighted yet but it is expected that this addition will soon be made and the town live up to its name, literally.

Cap de La Madeleine, Que.

The city of Cap de La Madeleine was recently without telephonic communication, a fire which destroyed the Union Hotel having buried the telephone cables nearby.

Galt, Ont.

The general charge in Hydro rates contains increases in the power and street lighting charges for this community. Manager W. H. Fairchild explained that the new rates provide for an increase of 15 to 20% in the street lighting charges and that the principal change was in the power charges, which amounted to practically an increase of 25% in the service charge. Previously the charge was $1 per h.p. with discounts of 25 and 10 per cent. Under the new rates the 25% discount is removed. The former charge amounted to 67½ cents a month per h.p. net, while under the new schedule of rates it will be 90 cents a month.

Guelph, Ont.

When the upper part of a telephone pole on which he was working broke off and fell to the ground, near Palmerston, Mr. Scott Cowan, was instantly killed. The pole on which he was working at the time of the accident was 40 feet in length, and when a piece broke off it near the top he fell with it.

Hamilton, Ont.

Adrian Rosseau, Vaudreuil, Que., was electrocuted recently while stringing wires for the Canadian National Telegraphs here. A charge of 2,200 volts passed through him, killing him almost instantly.

T. J. Stewart, M.P., for West Hamilton, recently stated that when the Grand Trunk railway is taken over by the Government portions of the lines will be electrified, including sections surrounding Hamilton. Although the main lines would not be electrified, the shorter runs were sure to be, Mr. Stewart stated. It was very likely that an electric service would be established between Hamilton and Toronto to relieve the passenger congestion upon the regular steam trains.

Hamill's Point, Ont.

At the summer home of J. R. C. Hodgson, Hamill's Point, Muskoka Lakes, radio programs are received with such volume that they are heard all over a room 40 feet long. The distance from the nearest broadcasting station is approximately 150 miles.

Ingersoll, Ont.

Public announcement was made recently that the business of the Hydro Department of the Utilities Commission had been placed on a strictly cash basis. Those who fall in arrears will have their service discontinued. It is understood that there are a number of fairly large accounts that have long been outstanding.

Kitchener, Ont.

A petition for ornamental lighting on Frederick Street has been sufficiently signed and certified. It was thought for a time that difficulty would be experienced in obtaining consent from the C. P. R. Telegraph company for the placing of the wires underground. The company has a franchise on the street and the city could not oblige the company to remove its wires from the poles.

The consent of the company to place the wires underground has been obtained with the understanding that the city pays for and supplies a duct to carry the cables of the telegraph company . The expense entailed in providing this concrete duct is cared for in the $26,000 estimate and is also noted on the petition which has been certified by the clerk. A trench will be excavated and concrete ducts constructed to carry the light and domestic service wiring on one side and the telegraph wiring on the other side.

Lobo Township, Ont.

Lobo Township will have the opportunity of deciding by vote whether hydro-electric power will be brought into the township or not according to a unanimous vote of the township council.

London, Ont.

One-man safety cars will be seen on London streets in the near future, following the action of the city council, which has granted the London Street Railway Company permission to operate five new cars of this type. If they prove a success, the company will be permitted to purchase more of these cars.

Listowel, Ont.

The Ideal Mfg. Co., are installing complete equipment for manufacturing a patent bread moulder. They are asking for prices on small electric motors in quantity.

Montreal, Que.

Approval has been given by the city council to the proposal to award to the firm of G. M. Gest, Limited, the contract for the construction of underground conduits in District No. 6 and District No. 9. The former is a large area extending from St. Lawrence boulevard from Craig to the river front and bounded on the east by Berri street. The older district is west of Bleury from Craig to St. Catherine, including Beaver Hall Hill, Dorchester and University Streets. This work will be undertaken immediately, and will be completed before the snow falls.

Oakville, Ont.

Oakville is the first of the municipalities along the proposed route of the Toronto-to-Niagara radial to which Chief Engineer F. A. Gaby of the Provincial Hydro Commission has submitted the draft resolution, which, according to the 1922 legislation, all municipal Councils must carry before the project receives Government sanction. Mr. Gaby found the Oakville representatives more convinced than ever as to the feasibility and desirability of modern rapid transit service from the border to Toronto, and the resolution was carried without a single adverse comment or an expression of doubt as to its ultimate success. Mr Gaby spoke optimistically of the situation and reiterated his declaration that the proposed radial line was to be of best modern construction, double-tracked in its early stages at least to Long Branch, with cars attaining a maximum speed of from 60 to 70 miles an hour into Toronto. "Conditions have changed since 1920," he said. "Prices have dropped from 25 to 50 per cent. We have prepared recently estimates, and can assure you that this railway between Port Credit and St. Catharines can be constructed considerably below the estimate that was submitted to the electors in January, 1917, and that, in view of conditions today, greater population throughout the district to be served, and the greater necessity for rapid transit, the revenue would be very much higher." Asked later what he estimated to be the reduction in cost on the line, Mr. Gaby said: "Anywhere from $750,000 to $2,000,000 less than the amount stated in your by-laws, depending on what it costs us for right of way. And even that includes considerable more double-track and more equipment than the estimate of the fall of 1916. Your district has grown, and requires more equipment.

Ottawa, Ont.

The dispute between the C.P.R. and its telegraphers has been settled it was stated at the Department of Labor recently. The dispute concerned a revision of the rules under which the telegraphers work. A board was appointed to deal with the dispute, D'Arcy Scott, of Ottawa, being chairman; U. E. Gillen, of Toronto, representing the company, and David Campbell, of Winnipeg, the men. After some progress had been made with proceedings before the board, negotiations were resumed directly between the company and the men and these negotiations have now resulted in a settlement.

Perth, Ont.

Mr. W. H. Collings, Perth, Ont., well known to the electrical trade, has recently opened a new store in that town, handling a full line of electrical fixtures.

Port Arthur, Ont.

One-man street car service on the Port Arthur civic railway has been initiated. In a bulletin issued by M. M. Inglis, Manager of Public Utilities, the co-operation of employees of the railway is asked for to make the service a success. The Public Utilities Commission will employ the necessary men to man the crossings where the street car tracks cross steam rails. It is hoped that in the near future the Utilities Commission will have a ruling from the Railroad Board regarding as to who shall be responsible for the maintenance of crossing watchmen. A thirteen-minute service will be given. Fort William is also ready to put one-man cars on the road and Port Arthur's intention is being communicated to the Fort William Utilities Committee, so that a uniform service can be given. When the schedule is in complete operation, eight cars will be on the main line run.

Quebec, Que.

The first intimation of the actual plans for the expansion of its street railway system by the Quebec Railway, Light, Heat and Power Company, has been given in the form of an interview with Mayor Samson. According to the report, work is already under way and is being rapidly pushed forward with a view to linking up the parishes of St. Sacrament and St. Malo, and it is estimated that the work will be completed in a few weeks. The new line will extend from the present terminus on St. Valier street to the famous "Bell Slope," and thence to St. Malo. It is understood that ten double truck cars have been secured by the company and that these will be in commission by the 1st of September. This addition to the rolling stock will eliminate the congestion which has prevailed in Quebec during the exhibition.

Stave Falls, B. C.

The Western Power Company of Canada, at Stave Falls, are contemplating extensive improvements. They are advertising in the Fraser Valley Record their application for a license to take and use 6,300 c.f.s. out of the Stave river, and also to store 220,000-acre feet, and to flood 15,000 acres of land.

Toronto, Ont.

The first automatic telephone switchboard to be known as the Grover Exchange is to be installed by the Bell Company in the east end, and by 1924 a second, the Elgin Exchange, will be installed down town in the new addition to be built at Temperance and Sheppard streets. Expenditures are also to be made in extensions to Parkdale, Main, Gerrard, Beach and in upper Dufferin street and Birchcliffe sections. In Toronto there are 110,000 subscribers and nearly 10,000 awaiting connections. Toronto's total number of subscribers is about 30 per cent. of the company's list.

Important Transformer Order

The Ferranti Meter and Transformer Manufacturing Company has recently received an order from the Hydro-electric Power Commission of Ontario for 179 transformers for the Commission's rural distribution systems. The transformers ordered are for 25 cycle service in sizes 5, 7½ and 10 kv.a. The Commission also placed with the same company an order for approximately twelve hundred three wire watthour meters.

Nova Scotia T. & P. Statement

Nova Scotia Tramways and Power Company for the six months ended June 30th. 1922 shows a change in its earnings position as compared with the first half of 1921. While there is no material difference in gross earnings, operating expenses have been reduced by over $100,000, making the ratio of operating to gross only 69.91 per cent., as compared with 81.37 per cent. last year. After allowance for taxes and interest and sinking fund requirements, there remains a surplus in excess of $59,000, compared with a deficit of over $22,000 for the corresponding period of 1921.

Wiring Contracts Awarded

Barrie, Ont.

Kilgone & Lambert, $3,500 res., Florence St.

F. Carpenter, $4,500 res., 20 Toronto St., E.

Belleville, Ont.

Moss & Stocks Elec. Co., 1145 Yonge St., Toronto, school

Cochrane, Ont.

H. W. Bishop, $4,200 res., 4th Ave.

Edmonton, Alta.

Hillas Elec. Co., library.

Fredericton, N. B.

Allan Staples, Queen St., $6,000 res., Landsdown St.

Wm. Boone, North Devon St., York Co. $5,000 res., Aberdeen & Northumberland Sts.

Hamilton, Ont.

John Fish & Percy Brown, $100,000 school, Wellington St., Wentworth St. & Brantdale Ave.

Kitchener, Ont.

Otto Reiber, Waterloo, $4,500 res.

Harris & Marson, 819 Parkway Ave., $375,000 technical school, King St. W.

Star Electric Co., King St., W. $4,500 res., Fairview Ave.; $4,500 each 2 res., Krug St.

London, Ont.

Arthur C. Bryce, 393 Grey St., 2 $8,200 res., Wortley Rd.; $6,500 res., Ridout St., S.

Moncton, N. B.

J. W. McCartney, St. George St., $5,500 res., Botsford St.

Wm. G. Crowley, St. George St., $15,000 3 flats, West St.; $5,000 res., Portledge Ave.

Edgar LeBlanc, Church St., $10,000 res., Highfield & John St.; $4,000 res., 58 Portledge Ave.

Monteith, Ont.

Toronto Elec. Co., 101 Duke St., Toronto, $38,000 school. Northern Academy.

Montreal, Que.

Wm. Rochon, 454 Lafontaine Park., $50,000 biscuit factory.

Sayer Electric Co., 87 Bleury St., bank 1950-4 St. James St.

Smith & Goodchild, 128 St. Peter St., $12,000 alt., store, St. Catherine & McGill; $12,000 alt. school, 516 Delisle St.

Vincent & Say, 344 Union Ave., $10,000 alt. res., 838-40 Lorne Cres.; $7,000 store, Montclair Ave.; $10,000 res., 901 Queen Mary R.

Acme Electrical Co., 1012 A Laurier W., $85,000, 10 stores, St. Catherine St., W.

A. L. Allard, 162 Mt. Royal E., $55,000 apt., Vendome & Sherbrooke Sts.; $22,000, 3 res., Wilson Ave.

Cable—Philip Lahee & Co., 3 St. Nicholas St. for $575,000 reservoir.

E. Choquette, 2090 Park Ave., $6,000 res., Waverley St. Wolsey Ave.

Geo. Shearington, 3186 Park Ave., $16,000 pr. s. d. res.,

B. Gregory, 55 c. Metcalfe St., $7,000 res.; $15,000, 2 res., Connaught St.

E. Miller, 141 Notre Dame St. Lachine, $9,000 cottage, Ballantyne Ave.

Uptown Electric Co., 926c St. Catherine W., $25,000 2 stores & 2 apts., Westminster & Milner.

North Bay, Ont.

Dingle & Alger, $2,800 res., 3rd. St., E.

Herbert & Co., $5,000 res., 2nd. Ave., E.

Ottawa, Ont.

P. Ackroyd, 416 Bank St., $5,000 res., Cobalt Ave.

H. L. Allen, 272 Bank St., $110,000 stores, Dalhousie St.

Mr. Chugg, $6,000 res., Grove Ave.; $5,500 res., Grove Ave.

A. Davis, LeBreton St., $5,000 res., Grove Ave.; $7,000 res., Carling Ave.; $5,500 res., Grove Ave.; $4,000 res., Wellington St.

E. Headly, 645 Echo Drive, $20,000 store & apts., Bank St.; $15,000 apts., 2nd., Ave.

(Changed) Mr. Lennox, $10,000 res., Willard St.

Mr. McLelland, $5,500 res., Bronson Ave.; $6,500 res., Bronson Ave.

Stan Lewis, 63 Metcalfe St., $10,000 nurses home, Aylmer Ave.; $10,000 dup. res., 1st Ave.

W. J. Stewart, Daly Ave., $5,000 alt. res.

Oakville, Ont.

B. E. Sprowl, $10,124 res., Watson Ave.

D. J. Sullivan, $5,500 res., Spruce St.

Outrement, Que.

A. Boismenu, 391 Belanger St., $14,000 cottage, Bloomfield Ave.; cottage, St. Viateur.

Geo. Shearington, 3186 Park Ave., $7,000 cottage, 554 Davaar Ave.

Regina, Sask.

Lorne Electric Co., 820 Smith St., $4,000 res., Dewdney St.

St. Boniface, Man.

T. W. Price, 33 Fawcett Ave., Wpg., $32,900 church & rectory, Oak & Dubuc Sts.

St. Catharines, Ont.

R. L. Roxborough, 27 Wellington St., E. Toronto, $600,000 collegiate, Catherine & Woodland Streets.

J. Desand, 187 St. Paul St., $2,500 res., Ontario St. Highway,; $4,000 res., Queenston St.

F. C. Crawford, Ottawa St., $3,500 res., Chaplin Ave.

H. C. Holmes, 30 Ann St., $3,500 res., 30 Albert St.

Sault Ste. Marie, Ont.

Greenwood Electric Co., 812 Queen St., E., $5,500 res., Borron Ave.; $2,500 warehouse.

St. Thomas, Ont.

St. Thomas Hydro, St. Thomas, $25,000 gym., Alma College.

Stratford, Ont.

Cook & O'Donoghue, Downie St., $3,500 res., Elizabeth St.

W. Gaul, Charles St., $4,500 res., Cambria St.; $3,600 res., St. Vincent Street.

Sudbury, Ont.

J. J. Martin, Capreol, Ont., $6,000 res., Parir St.

Sussex, N. B.

Vaughan Electric Co., Ltd., 94 Germain St., St. John, $145,000 high school.

Sydney, N. S.

E. D. Murphy, Charlotte St., $20,000 store & offices, Charlotte St.

Toronto, Ont.

J. A. Craig, 20 St. Annes Rd., $15,000 res., Rushton Rd.

R. A. L. Gray, 85 York St., welfare bldg., Fraser Ave.

Lockwood & Jacques, 801 Ossington Ave., $8,000 each, 6 stores & apts. Roehampton Ave.

R. A. L. Gray & Co., 85 York St., $9,000 res., Thorncliffe Blvd.

G. G. Fiegham, 116 Glencairn Ave., $6,000 each, 3 res., Deloraine Ave.

Perrin & Hallam, 258 Laughton Ave., $150,000 apt. house, King W.

M. Price, $18,000 res., 14 Northcliffe Blvd.

Canada Electric Co., 175 King E., $100,000 school, Bowmore Rd., Contract Price $1,905.

Verdun, Que.

Vincent & Say, 344 Union Ave., $55,000 church.

Victoria, B. C.

Hawkins & Hayward, 1103 Douglas St., $15,000 add. stores, Douglas St.

Murphy Elec. Co., 603 Sayward Bldg., $10,000 res., Tyndale Ave., Gordon Head.; $5,000 res., 1528 Monterey Ave.; $5,100 res., 1326 Manor Rd.

Sun Electric Co., 643 Yates St., $93,000 building, Government & View Sts.

A. B. Whitman, 2020 Chaucer St., $3,500 alt. apt., 1176 Yates St.

Waterloo, Ont.

Otto Reiber, 50 Queen St. N., $4,000 res., King & Spring Sts.; $5,000 Noecker St.

Westboro, Ont.

Stan Lewis, 63 Metcalfe St., Ottawa, $50,000 collegiate, Broadway Ave.

Westmount, Que.

H. E. Cassidy, 255 Regent Ave., $4,000 garage, 561 Roslyn Ave,

Vincent & Say, 344 Union Ave., $20,000 building, Sunnyside Ave.

Winnipeg, Man.

Electric Engr. Co., 965 Main St., $30,000 school, Magnus & Andrew Sts.

Timmins & Boughton, 338 Robert St., $10,000 res., Waverley St.

Over 1,500 motor car jitney licenses were issued in Buffalo on the first day of the street car strike.

POWER CABLE

350,000 C. M. 3-Conductor 12000 volt
Paper Insulated, Steel Tape Armoured Cable

Overall Diameter—3.62 ins.

Built to Specification of Hydro-Electric Power Commission of Ontario

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Eugene F. Phillips Electrical Works, Limited
Montreal

The Oldest and Largest Manufacturers of Bare and Insulated Wires and Cables in the British Overseas Dominions

Position open for engineering student to train for sales department, good opportunity for progressive type of young man. A. H. Winter Joyner, Ltd., Toronto. 17

Wanted—Mechanical Draftsman, preferably familiar with Electrical work. Must be experienced. Send outline of experience and salary expected to Box 976, Electrical News, Toronto. 16-17

Position wanted—as an electrical repair man with large concern in the city. My present position is with a large firm in Michigan, U.S.A. which position I have held for three years. I also have had two years experience in house wiring and contract work. I am steady, honest and sober. Apply Box 992 Electrical News, Toronto. 17

GENERATOR SET

G.E. Direct Connected Motor Synchronous type 710 H.P. 2300 volt, 60 cycle, Generator Amps 1820, volts full load 275, speed 400 R.P.M.

Machinery Equipment & Supply Co., Regd.,
42 Queen St.,
Montreal. **16-17**

SECOND-HAND METERS FOR SALE

48—Type G, Packard—5-10 Amp—$3.50 each.
15—Type E, Packard—5-10 Amp— 1.00 each.
50—Type B, Ferranti—5-10 Amp— 5.00 each.
38—G —5-10 Amp— 1.00 each.
5—Stanley —5-10 Amp— 1.00 each.

The above meters are 110 volt, 2 wire, 60 cycle meters, and items one and three have been adjusted to pass inspection, items two, four and five have not been adjusted.

Hydro-Electric Power Commission of Ontario, Engineering Dept., 190 University Ave., Toronto.
14-17

Electric Trucks for Express Service

With the purchase recently of 104 electric trucks, the American Railway Express Company has still further strengthened its claim as the largest user of electrics in the world. The company now has in service throughout the United States more than twelve hundred electrics—this in addition to its gasoline trucks and horse-drawn wagons.

The new equipment is for service in New York, Philadelphia and Buffalo. The New York allotment comprises twenty trucks of the five-ton size; Philadelphia is to have fifty two-ton trucks, while the thirty-four for Buffalo are of the two- and three-ton sizes.

It is planned to use the New York trucks on a twenty-four hour basis. This will be accomplished by means of standardized, interchangeable batteries, each truck being provided with two storage batteries. Thus at the end of the first shift the exhausted battery will be removed and a freshly charged one put in its place. The battery boxes are designed for rapid changing and special devices for battery handling have been installed at the charging stations. It is estimated that the exchange of batteries will require less time than it took to fill the tanks of the five-ton gasoline trucks which the electrics are replacing.

The American Association of Engineers at a recent meeting of its Board of Directors held in Chicago accepted the invitation of the American Construction Council to become a member of that body. A. N. Johnson, president of the A. A. E., expressed the opinion that "the American Construction Council will have a most stimulating effect in adjusting the many perplexing problems that confront the public to-day in the endeavor to carry on the construction of both public and private enterprises in all parts of the country."

NEW AND USED

MOTORS

In Stock for Immediate Delivery

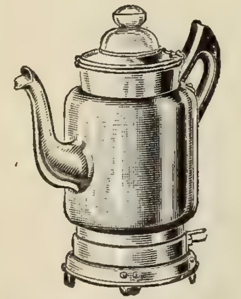
100 h.p.,	3 ph.,	25 cyl.,	550 volts,	710 r.p.m.
60 h.p.,	3 ph.,	25 cyl.,	550 volts,	750 r.p.m.
52 h.p.,	3 ph.,	25 cyl.,	550 volts,	720 r.p.m
50 h.p.,	3 ph.,	60 cyl.,	550 volts,	970 r.p.m
50 h.p.,	3 ph.,	25 cyl.,	550 volts,	720 r.p.m.
35 h.p.,	2 ph.,	60 cyl.,	200 volts,	1150 r.p.m.
30 h.p.,	3 ph.,	25 cyl.,	550 volts,	750 r.p.m.
30 h.p.,	3 ph.,	25 cyl.,	550 volts,	1500 r.p.m.
25 h.p.,	3 ph.,	25 cyl.,	550 volts,	750 r.p.m.
15 h.p.,	3 ph.,	25 cyl.,	220 volts,	720 r.p.m.
15 h.p.,	3 ph.,	25 cyl.,	550 volts,	750 r.p.m.
15 h.p.,	3 ph.,	60 cyl.,	220 volts,	1200 r.p.m.
13 h.p.,	3 ph.,	25 cyl.,	550 volts,	700 r.p.m.
10 h.p.,	3 ph.,	66 cyl.,	220 volts,	1333 r.p.m.
7½ h.p.,	2 ph.,	60 cyl.,	200 volts,	1120 r.p.m.
5 h.p.,	3 ph.,	60 cyl.,	550 volts,	1750 r.p.m.
5 h.p.,	3 ph.,	25 cyl.,	550 volts,	1500 r.p.m.
3 h.p.,	3 ph.,	60 cyl.,	550 volts,	1750 r.pm.
3 h.p.,	3 ph.,	60 cyl.,	550 volts	1120 r.p.m.
3 h.p.,	3 ph.,	25 cyl.,	550 volts,	1500 r.p.m.
3 h.p.,	3 ph.,	25 cyl.,	550 volts,	1400 r.p.m.
2 h.p.,	3 ph.,	60 cyl.,	550 volts,	1750 r.p.m.
2 h.p.,	3 ph.,	25 cyl.,	550 volts,	1440 r.p.m.
2 h.p.,	3 ph.,	25 cyl.,	550 volts,	1400 r.p.m.
1 h.p.,	3 ph.,	25 cyl.,	550 volts,	1500 r.p.m.
1 h.p.,	3 ph.,	25 cyl.,	110 volts,	1420 r.p.m.
1 h.p.,	3 ph.,	25 cyl.,	220 volts,	710 r.p.m.
½ h.p.,	1 ph.,	60 cyl.,	110 volts,	1725 r.p.m.
1/6 h.p.,	1 ph.,	60 cyl.,	110 volts,	1725 r.p.m.
1/6 h.p.,	1 ph.,	60 cyl.,	110 volts,	1150 r.p.m.

Machinery **Supplies**

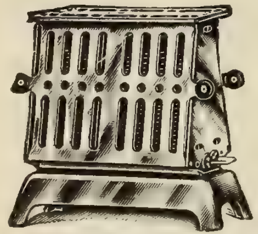
Ask for our latest stock list

H. W. PETRIE, Limited

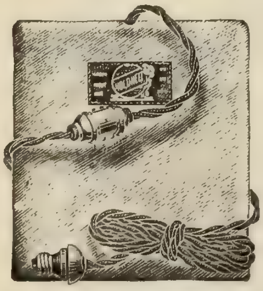
131-147 Front St. West, Toronto



Percolator. Retails $12.



Automatic Toaster Retails $8



Warming Pad. Retails $12.

Hold-Heet Appliances Sell on Sight

The extensive sales of "Hold-Heet" Appliances prove their popularity. Dealers who handle them are securing profitable business. Their attractive appearance, wide range of usefulness, and evidence of thorough workmanship will at once interest your customers. No progressive dealer should be without such a ready selling line.

Get our complete price list of "Hold-Heet" Appliances. Prompt shipment of every order is assured.

2 Years Guarantee

With every sale of "Hold-Heet" Appliances you can give your customer a 2 year guarantee against defects and burnouts—a guarantee good enough to clinch a sale every time, and evidence of an unusual goodwill service.

See them at the Exhibition

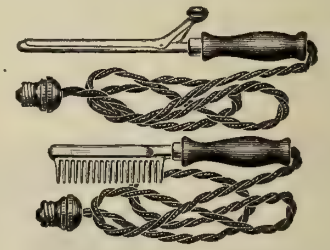
Our exhibit will be second inside Main Entrance of the Electrical Building, where you are cordially invited to a demonstration.

Toronto Electric Supply Co., Limited

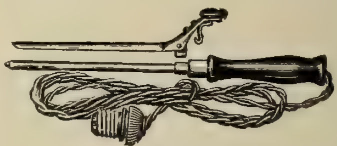
Canadian Distributors

36 Adelaide St.W. TORONTO, Canada

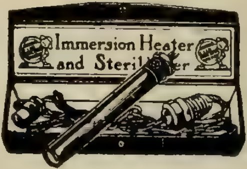
Phones Main 272 and 273



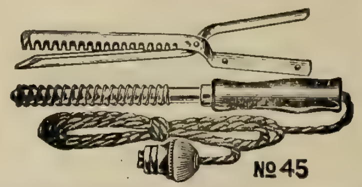
Top—Curling Iron No. 31 Retails $5.
Lower—Hair Dryer No. 21 Retails $5.



DeLuxe Curler and Waver Retails $12.

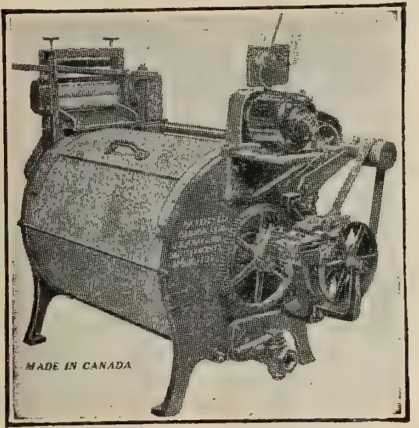


Immersion Heater. Retails $6.



Marcel Waver. Retails $12.

Electric Washing Machines
FOR
HOTELS HOSPITALS INSTITUTIONS
AND
LAUNDRIES OF EVERY DESCRIPTION



With Patented Single Belt Reverse Movement

A Real Washer For Commercial Work

Strong
Durable
Efficient
Economical

Made in all standard sizes with wood or iron casing. Run by motor and connected with lighting circuit or from line shafting, or gasoline engine.

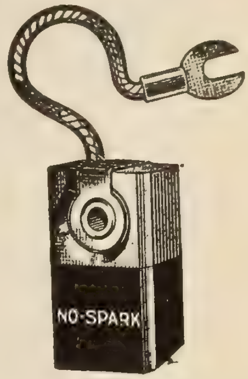
AGENTS WANTED

SUMBLING MACHINERY CO., Limited
7-15 St. Mary St., Toronto
Manufacturers of Laundry Machinery

Quiet, Sparkless Operation
with NO-SPARK Carbon Brushes

NO-SPARK brushes have perfect lubrication in the brush which produces a glazed surface on the commutator, gives quiet, sparkless operation and reduces operating costs. They will carry at least 50% more load than other brushes.

Will you give them a trial? Just send us a few details and we can tell you the exact brush to give you perfect results.



CALEBAUGH
Self-Lubricating Carbon Co.
1503 Columbia Ave., PHILADELPHIA, PA.
Canadian Representative
Cassco General Supplies, Reg'd., 315 Craig St., W.
Montreal, Canada

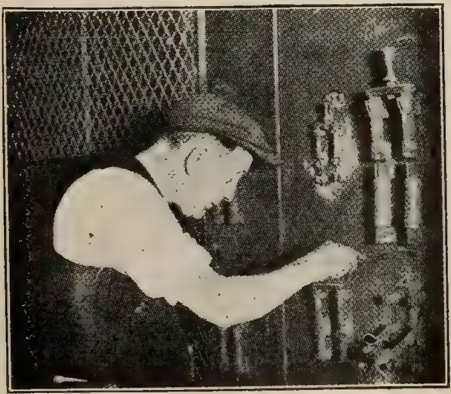
"Fix it with Rawlplugs"

FOR SWITCHBOARD WORK

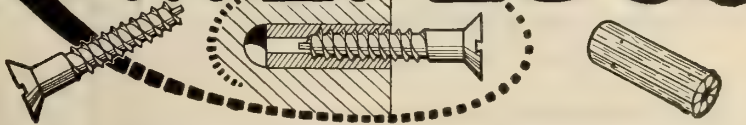
SIMPLE - ECONOMICAL - EFFICIENT - SPEEDY

The electrical man who uses Rawlplugs is bound to have a big advantage over the man who still uses the old type of Fixing Devices. In the first place, Rawlplugs cost less, hold better and require much less time to install. They require a smaller hole than other devices, screw sizes being equal. They never fracture the material and never work loose because they absorb vibration. Another feature is their light weight. Several hundred may be carried around on the job quite easily.

Used by C.P.R., Northern Electric Co., Devoe Electric Switch Co., Monarch Electric Co., Toronto Hydro Electric System, and many others. Write for samples and prices.



RAWLPLUGS



INVENTIONS LIMITED
Sole Agents for the Rawlplug Co. of Canada
Southam Building Bleury Street Montreal

Sales Agents for Ontario: Dominion Engineering Agency, Limited, 24 Adelaide St., East, Toronto. Stocks carried by: Rice Lewis Co., Toronto; Factory Products, Ltd., Toronto.

The Rawlplug Company, 461 Eighth Ave., New York City.

-Just Good Equipment-

GENERATORS— D.C. 125-250 volts

1-2-3-5-7½-10 Kw standard makes rheostats and pulleys.

A.C. 60 cycle

15-30-50-75-100-300 Kw pulleys, bases and rheostats.

MOTORS— A.C. 60 cycle 3 phase

3-5-7½-10-20-30 H.P. and upwards all complete.

All sizes of repulsion type single phase motors.

A.C. 25 cycle 3 phase

1-2-3-5-7½-10-25-30-40-50 H.P. and upwards all complete.

All sizes of single phase motors, repulsion type only.

SEE——RADIO——SUPPLIES

YES—We can supply you with that receiving set you want. OR get that loose-coupler, tuning coil, condenser, insulator, grounder, battery, detector, wire, variometer FROM US.

ASK US QUESTIONS ABOUT YOUR SET OR WHAT YOU WILL INSTALL.

Industrial Engineering Company of Canada, Limited
Consulting Engineers—Electrical Equipment
R. G. Lee, General Manager
TORONTO OFFICE: 28 Wellington St. W., Carlaw Bldg.

Reliable Used Motors

220 Volt - 3 Phase - 25 Cycle

1— 5 HP. Robbins & Myers, 1500 rpm. Complete.

550 Volt - 3 Phase - 25 Cycle

1—10 HP. Can. Westinghouse, 750 rpm. Base Pulley & Starter.
1—20 HP. Lancashire Ball Bg. 750 rpm. Base, Pulley & Starter.
2—50 HP. Crocker Wheeler, 750 rpm Base, Pulley & Starter.
1—75 HP. Crocker Wheeler, 750 rpm. Base, Pulley & Starter.

220 Volt - 3 Phase - 60 Cycle

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1—30 HP. Can. Westinghouse 1200 rpm. Base, Pulley & Starter.
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25 Cycle Single Phase Motors 110/220 Volt

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2—1/2 HP. Century, 1500 rpm.
1—3/4 HP. Century, 1500 rpm.
3—3 HP. Gen. Elec. Type RI 1500 rpm.
1— 1 H.P. Century 110/220 V. 1460 rpm. 25 cycle.
1—1½ HP. Century 110/220 V. 1460 rpm. 25 cycle.
1— 2 HP. Century 110/220 V. 1460 rpm. 25 cycle.

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1—20 H.P. 1200 RPM. T.H.E., Complete
1—20 H.P. 1200 RPM. Westinghouse, Complete
1—15 H.P. 1800 RPM. C.W., Complete
1—7½ H.P. 1800 RPM. T.H.E., Complete
1—7½ H.P. 1200 RPM. A.C., Complete
1— 5 H.P. 1200 RPM. Westinghouse
1— 2 H.P. 600 RPM C.G.E.
1— 1 H.P. 1800 RPM. T.H.E.
1— 2 H.P. 1800 RPM.

SECOND-HAND 2 PHASE, 60 CYCLE, 220 V. MOTORS

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1—7½ H.P. 1800 RPM. T.H.E., Complete
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(a) Five year bonds, dated 1st November 1922, to mature 1st November, 1927.

(b) Ten year bonds, dated 1st November, 1922, to mature 1st November, 1932.

While the maturing bonds will carry interest to 1st December, 1922, the new bonds will commence to earn interest from 1st November, 1922, GIVING A BONUS OF A FULL MONTH'S INTEREST TO THOSE AVAILING THEMSELVES OF THE CONVERSION PRIVILEGE.

This offer is made to holders of the maturing bonds and is not open to other investors. The bonds to be issued under this proposal will be substantially of the same character as those which are maturing, except that the exemption from taxation does not apply to the new issue.

Holders of the maturing bonds who wish to avail themselves of this conversion privilege should take their bonds AS EARLY AS POSSIBLE, BUT NOT LATER THAN SEPTEMBER 30th, to a Branch of any Chartered Bank in Canada and receive in exchange an official receipt for the bonds surrendered, containing an undertaking to deliver the corresponding bonds of the new issue.

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The bonds of the maturing issue which are not converted under this proposal will be paid off in cash on the 1st December, 1922.

W. S. FIELDING,

Minister of Finance.

Dated at Ottawa, 8th August, 1922.

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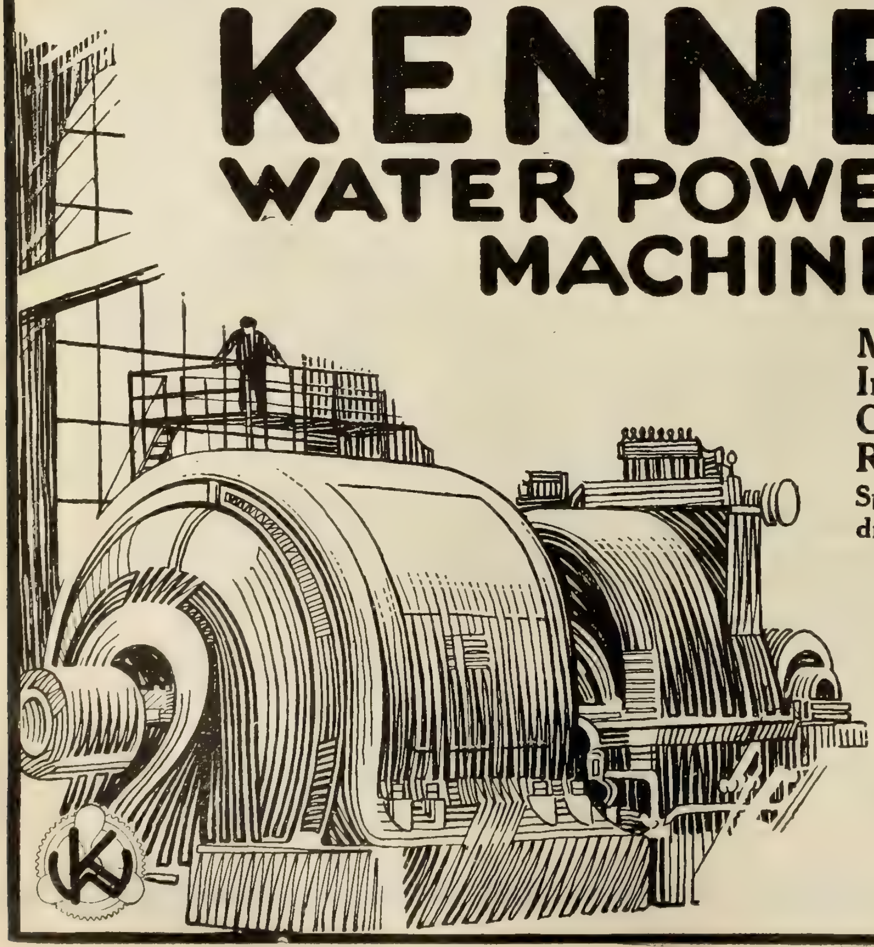

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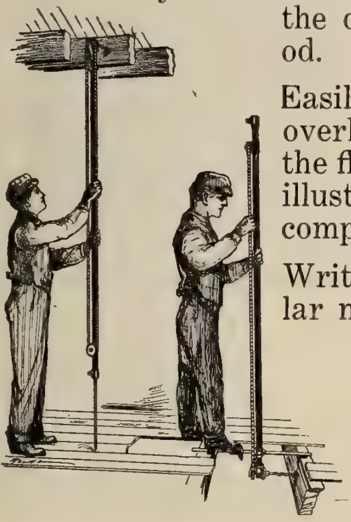

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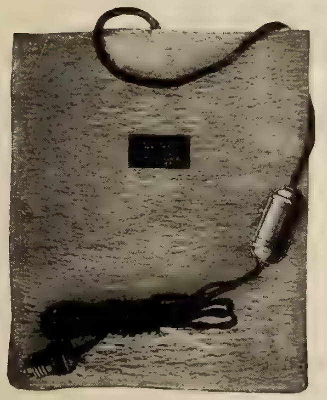

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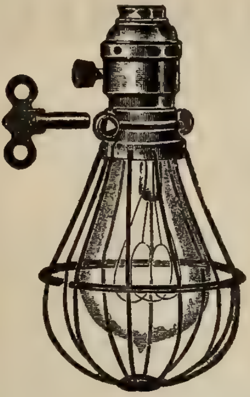

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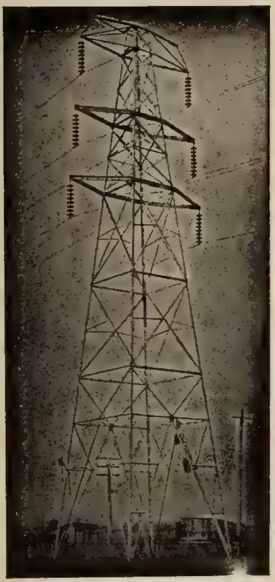

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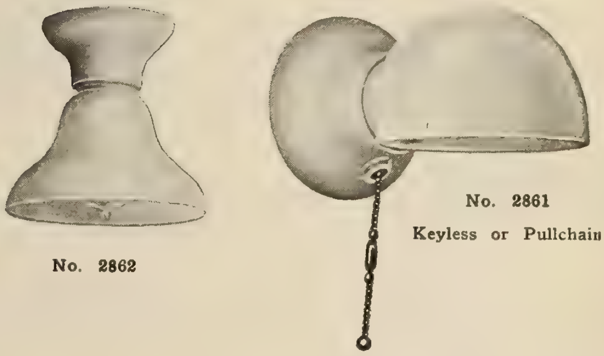

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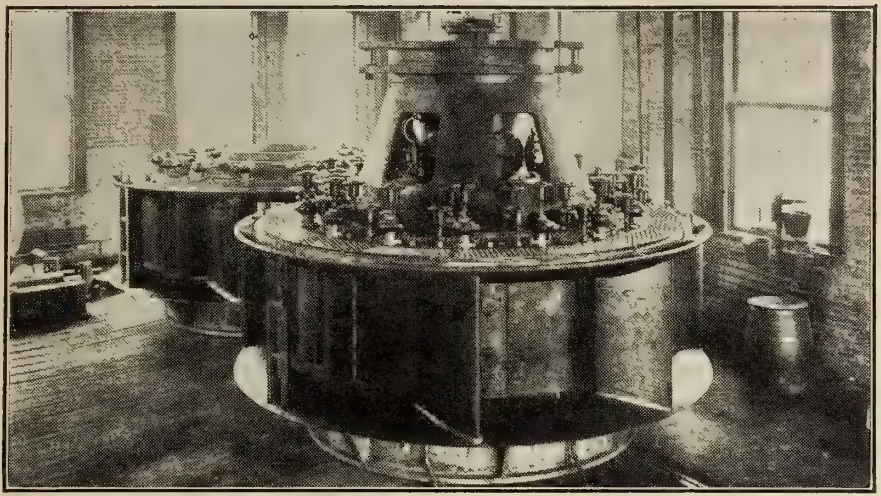

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Cooperstown, N. Y.

Holtzer-Cabot

Hospital Signal Systems

have a number of exclusive features which can only be thoroughly appreciated by means of a study of the details in our catalog — but the main feature is the *Holtzer-Cabot* Button. This patented Locking Button contains *all* the mechanism. There is virtually nothing in the walls but the wiring. Troublesome, hard-to-get-at contrivances attached to wall plates and concealed in walls are eliminated. The simplicity and flexibility of this system make it ideally serviceable and economical. It is, in a word, trouble-proof, for at any moment you can plug in another cord and button to change a station or correct the defect that so seldom occurs.

The detailed story is in our new illustrated brochure "Hospital Signal Systems." Please let us have your address so that we may mail you one.

The Holtzer-Cabot Electric Co.

125 Amory St., Boston — 101 Park Ave., New York
1104 Union Trust Bldg., Baltimore
6161 So. State St., Chicago — 517 Union Bldg., Cleveland
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TRADE MARK

STANDARD Wires and Cables

Unexcelled in quality
Dependable in service
Economical in price
For all classes of service.

**Standard Underground Cable Co.
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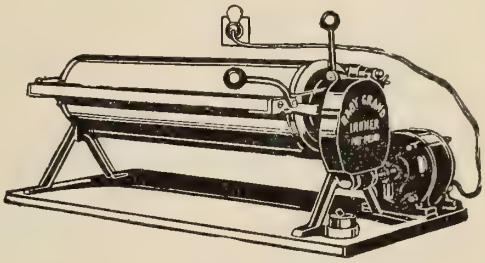
Branch Offices and Warehouses:
Montreal, Toronto, Hamilton, Winnipeg, Seattle.



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Baby Grand Ironer

"A Household Necessity"

Mechanically perfect, this machine will last for years. The motor is of standard make directly connected to the gears, thus doing away with the uncertain belt.

Pressure is regulated by a small cam lever. The clutch enables the roll to be reversed or to stand in any position.

Full details are contained in our folder. Write for it to-day.

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Double the Life of Your Pole Lines

By using our

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British Columbia Cedar Poles

They afford your pole lines better support, and add considerably to their appearance. Let us send you further particulars and prices No obligation.

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This is the first of an interesting series

From start to finish—

Acme Strain Clamp

Acme Strain Clamp —right at the start— used in the big hydro developments. Always Peirce quality nothing less.

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Limited
Hamilton - Canada

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Mechanical
Chemical

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CHARLES BRANDEIS, C.E., E.E.
Consulting Engineer
We negotiate sale and purchase of developed and undeveloped water-powers.
Estimates made on power available and costs of development.
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Telephone Uptown 2826.

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Meter Engineer,
Meters tested, recalibrated and repaired.
Previous to Government inspection.
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CANADA ELECTRIC CO.
Contracting Electrical Engineers
"Work That Counts"
MAIN 1556
175 KING ST. E., TORONTO

PROMPT and EFFICIENT ELECTRICAL REPAIRS
Give your electrical equipment the attention it deserves.
Our specialties are Re-wind and Motor Repairs A. C. & D. C. also Meter Repairing,
Electric Motor Repair Co.
349 Talbot St., London, Ont.

Electrical Testing
Laboratories

"Electrical, Photometrical and Physical Tests and Inspections".

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Procured in all Countries
Special attention given to Patent Litigation
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Plans, Specifications and Estimates
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Save Money by Advertising for your Tenders

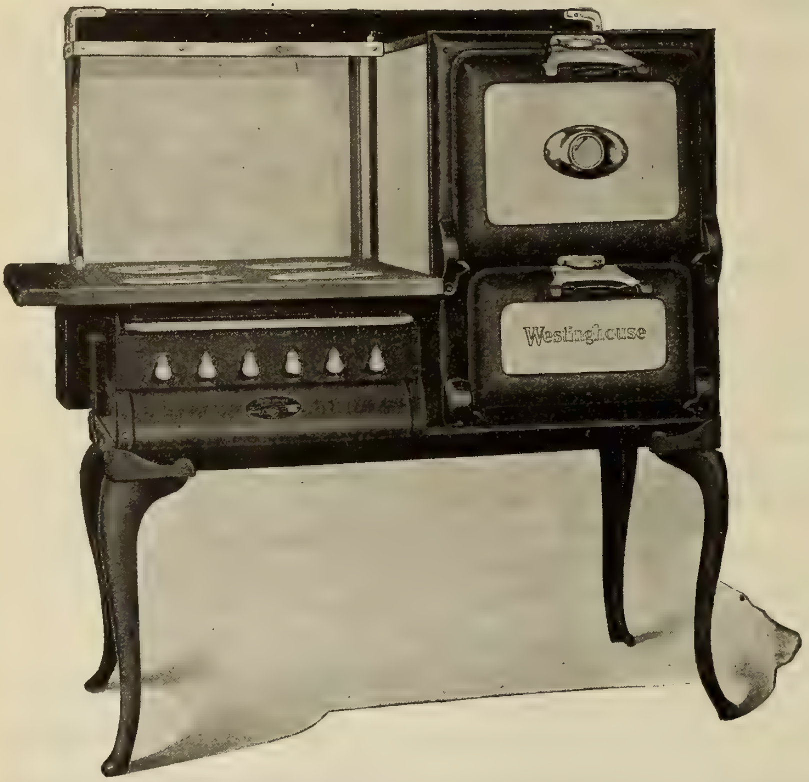
Competition will keep bids on your work or supplies down to the minimum figure. An advertisement in the

Tender Department
of the
Contract Record
and
Engineering Review

will put you in touch with the great majority of reliable contractors, and help you get the best firm for the job and the right price for the work.

Use the Contract Record Tender Department for the next job.

Westinghouse



Westinghouse Type MH Electric Range

Electric Ranges

An Idea that has met with success:

A certain dealer hit upon a real idea for boosting the sale of Westinghouse Ranges.

He went to the high school, normal school and university in his town and succeeded in placing a Westinghouse Electric Range in each. As the domestic science courses in these institutions taught the latest ideas in cooking, these sales were not difficult.

Each girl who used the electric range soon found that the Westinghouse way was the only way to cook. She naturally told her parents about it.

In a few years when she has a home of her own, she will, of course, want a Westinghouse Range for herself.

Why not use this same idea to stimulate your sales of Westinghouse Ranges?

Canadian Westinghouse Co., Limited. Hamilton, Ont.

TORONTO, Bank of Hamilton Bldg.
HALIFAX, 105 Hollis St.
CALGARY, Canada Life Bldg.
MONTREAL, 285 Beave. Hall Hill
FT. WILLIAM, Cuthbertson Block
VANCOUVER, Bank of Nova Scotia Bldg.
OTTAWA, Ahearn & Soper, Ltd.
WINNIPEG, 158 Portage Ave. E.
EDMONTON, 211 McLeod Bldg.

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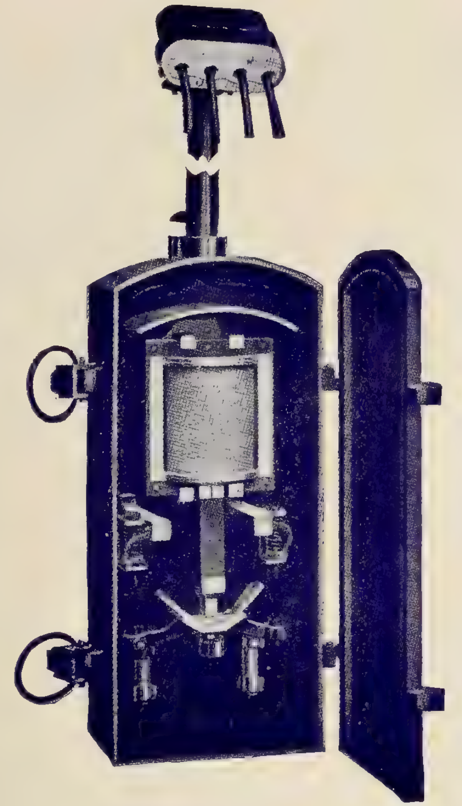
MONTREAL—113 Dagenais St.
TORONTO—366 Adelaide St. W.
VANCOUVER
1090 Mainland St.
WINNIPEG—158 Portage Ave. E.
CALGARY—316 3rd. Ave. E.

CANADIAN WESTINGHOUSE



Cap. 30 Amp

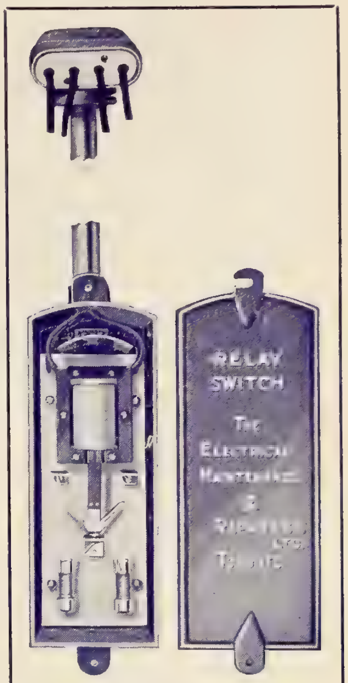
Engineers, Take Notice!

A new, smaller, simplified Remote Control Switch.

A young friend of our 30 Amp Switch—to do the many small jobs where the big fellow is too expensive.

Cheaper, yet perfectly dependable. Has been tested equal to five years' service.

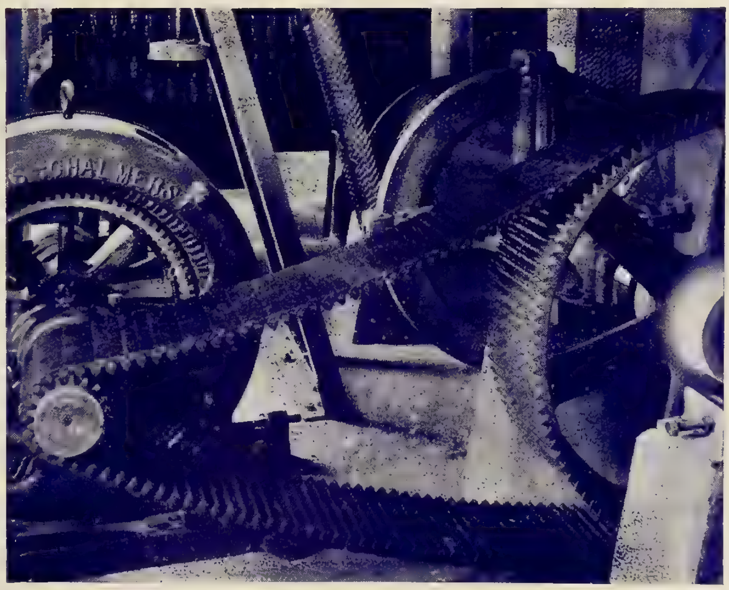
For Street Lighting Control. Write about this.



Cap. 15 Amp

The Electrical Maintenance & Repairs
Company, Limited
162 Adelaide Street West Toronto

Morse Silent Chains



100 H.P. Morse Chain Drives to Terminal Grain Elevator.
This is one of 39 Drives in the Elevator

YOU CANNOT BUY
a
BETTER DRIVE

If this picture suggests a possible application of Morse Chain Drives to troublesome or expensive belt transmissions in your factory consult our sales engineers.

The Cost of Application Is Not Large

The Return on the Investment is a Large One

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TORONTO MONTREAL

Electric

SWEEPER-VAC

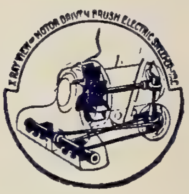
With Motor Driven Brush

It Cleans and Sweeps without injury to the rugs

FULLY GUARANTEED

Sold on easy terms We carry the accounts

Liberal Proposition for "Sweeper-Vac" Agencies


X RAY VIEW — MOTOR DRIVEN BRUSH ELECTRIC SWEEPER-VAC

Banishes Dirt

EARLE
LIMITED
ELECTRIC

Abolishes Dusting

Takes the "Weeping" out of "Sweeping"

Write now for particulars and get lined up for the Spring Trade

66-72 NELSON ST.
TORONTO

Phone Adelaide 1081 Adelaide 1082

CABLE TERMINAL DEVICES

POTHEADS, DISTRIBUTION BOXES

G & W 35,000
VOLT POTHEADS

for dependable service—

Continuous service from comprehensive distribution systems results from careful planning and from the selection of the right sort of equipment.

G & W Potheads are one strong link in any carefully planned system.

That they render a really dependable service, with little maintenance, has been proven on innumerable distribution systems.

You can judge them by the number of representative users who have adopted them as standard equipment.

The G & W Engineering Staff will co-operate with you in planning a completely serviceable distribution system. Tell us your problem.

G & W Electric Specialty Co.

7440-52 So. Chicago Ave. CHICAGO, U.S.A.

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Bentz-Richardson Co., Ltd., 592 Notre Dame Ave., Winnipeg.
General Supplies, Limited, Calgary and Edmonton.

G & W ELECTRIC SPECIALTY CO.

Vol. XXXI No. 18 Toronto, September 15, 1922

Electrical
Engineering
Contracting
News
Merchandising
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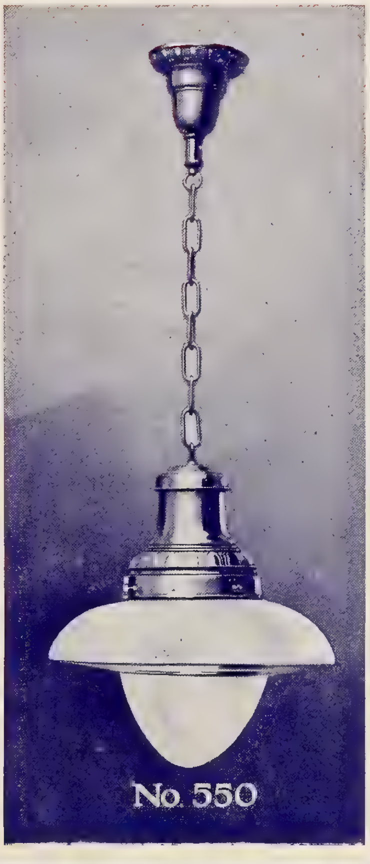
Commercial Lighting Units

Our new designs and improved glass have been combined to produce our new lighting units.

We have ten new units which will answer any requirements for commercial lighting.

Samples, illustrations and prices submitted on request.



No. 550

New units are made of Sol-lux, Moonstone, Enamelled and Cased-glass.

Business can be stimulated by offering new goods. We have them for you.

Ask for No's 515, 516, 517, 396 (improved), 397, 555, 550, 551, 399 and 424.

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388 CARLAW AVE
TORONTO
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164 BAY ST. TORONTO

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Glass
COMPANY LIMITED

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THE TWENTIETH CENTURY LINE

- Flush Type Cabinets
- Motor Starters
- Type E Box
- Motor Drip Pans
- Motor Covers
- Rheostat Boxes

And all Types of Steel Cabinets

- Flush Switch Boxes
- Loom Clips
- Blank Condulet Covers
- Pressed Copper Lugs
- Meter Protectors
- Porcelain Bushings

Black Enamelled Made-in-Canada

To ensure the greatest efficiency in your lighting installations, be sure you get Canadian Drill & Electric Box Co.'s products—they are made in Canada by Canadians with Canadian capital and comply with H.E.P.C. and Underwriters' regulations.

Our Display at the National Exhibition

was one of the features of the Electrical show and attracted marked attention and favorable comment.

Canadian Drill & Electric Box Co., Limited
1402 Queen St. East, Toronto, Ontario

Announcement

EXTRAORDINARY

An Electric Heater to Retail $7.50

Specification

Solid copper reflector 11″ diameter, beautifully burnished cast iron base weight 2½ lbs., dia. 7″, fluted design. Base and back of reflector finished in indestructible black enamel—adjustable reflector. Filament equal to any on the market. 600 watts, 110 volts A C or D C. Equipped with 7 feet standard underwriters approved cord and two piece separable attachment plug.

Gilbert Polar Cub Electric Heater $7.50

We will soon be sold up—Act now

The A. C. Gilbert - Menzies Co., Limited 439 King St. W.
TORONTO

Judging by the Interest Shown

Our exhibit at the Canadian National Exhibition has clearly demonstrated that the wide-awake manufacturer is not slow to appreciate the value of a material that will reduce manufacturing costs without reducing the quality or volume of production.

Our representatives have been kept busy demonstrating to hundreds of interested visitors how they can accomplish this by the use of

DIAMOND FIBRE

and the display of Waterproof Noiseless Gears proved a particular centre of attraction in this respect. Perhaps the feature of our exhibit which created the most interest however was the display of different forms of

Condensite CELORON

for use with radio equipment and for other electrical purposes.

If you do not already know all about Diamond Fibre write for descriptive literature.

DIAMOND STATE FIBRE Co. OF CANADA LIMITED
235 CARLAW AVE. TORONTO
DIAMOND STATE FIBRE Co. OF CANADA LIMITED
MADE IN CANADA
DIAMOND FIBRE
QUALITY & SERVICE
SHEETS, RODS, TUBES & SPECIAL SHAPES
PRODUCTS
PRODUCTS

Diamond State Fibre Company

of Canada Limited

Head Office and Works: 235 Carlaw Ave., Toronto, Ont.

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56 Carlton St.

ST. JOHNS, Que.

WINNIPEG
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501 Confederation Bldg.

MANUFACTURERS OF FLEXIBLE CONDUIT AND KRAFT PAPER CORD

LOOMDUCT

A Single Wall Conduit of Unusual Flexibility.

Every coil of "Loomduct" and "Insuladuct" is fished at the factory and guaranteed against defects of every kind.

INSULADUCT

A Double Wall Conduit of Great Strength and Durability.

TRADE MARK
Loomduct
REGISTERED

APPROVED BY THE BOARD OF FIRE UNDERWRITERS : :

TRADE MARK
Insuladuct
REGISTERED

THE FOLLOWING SIZES ALWAYS IN STOCK :— 1/4" 3/8" 1/2" 5/8" 3/4" 1"

Specify

MADE IN CANADA

TRICABLE
Armoured Conductors
TRISTEEL
Flexible Steel Conduit

Make
Canada
Prosperous
by
Buying
Canadian
Products

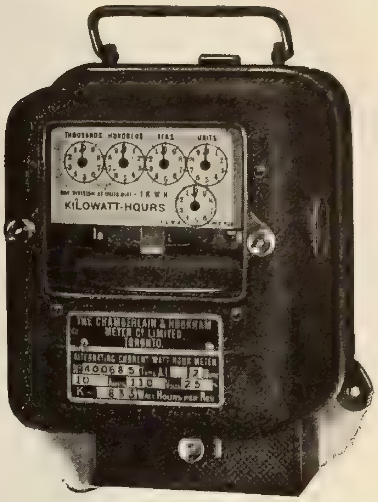
Selling Agents
Conduits Company Limited
33 Labatt Avenue TORONTO

Government Re-Testing

302 C & H Meters were due for re-inspection in an Ontario town.

They were sent into the test room on Monday, the following Friday 302 Meters left the test room re-sealed, no parts or repairs being required to accomplish this end.

How's this for quality and reliability? Send us your orders.



Chamberlain & Hookham Meter Co., Limited

243 COLLEGE STREET, TORONTO

Branches all over the World

Thomson Electric Motors

in use in many of the largest manufacturing
plants in Canada

are built by

FRED THOMSON CO., LIMITED

ELECTRICAL ENGINEERS

7-13 ST. GENEVIEVE STREET MONTREAL

The Sangamo Watt Hour Meter

Sangamo meters are used throughout the world. Since 1897, when development was started, through 1899, when the company was organized, on up to the present, this meter has been a recognized "Service to the Industry".

Sensitive, reliable, accessible, equipped for easy full and light load adjustment, the Sangamo Meter has few equals for the measurement of actual current consumption.

The Lincoln Demand Meter

Lincoln Demand Meters have ably assisted in the rapid progress of rate making. This meter's accurate measurement of demand has lifted rate making from a one-sided problem involving guesswork to a plane of entire satisfaction for both central station and consumer. Fixed charges, formerly neglected or considered in an uncertain manner, are now measured as accurately as the actual watt hour consumption.

The wide acceptance of the Lincoln Demand principle indicates its high position in the electrical industry.

now available as the Lincoln-Sangamo Unit

THESE two instruments can now be purchased in the form of a single meter. A recent arrangement of the two manufacturing companies makes possible this unit for measurement **of watts or volt-amperes of demand and kw. hours** of consumption. This arrangement was possible because both instruments were developed and are made in Canada,—in fact, in the same city.

By the measurement of **both** actual consumption and maximum watts or volt-amperes of demand, the consumer is billed on a 100% **metered** basis. His power factor is considered.

A small switch, contained within the instrument, makes demand available on either a watt or volt-ampere basis over a wide range of power factor. The consumer is not penalized because another consumer on the same distributing lines with him has a poor power factor. The central station can accurately take its fixed charges into consideration in billing, an important item because the fixed charges amount to 80% of the total cost of furnishing power in a hydro-electric plant, 45% in a steam. No estimating is necessary.

The unit is made in 5, 10, 15, and 25 ampere sizes of 100, 200, and 500 volts. Whatever the size, the unit facilitates installation and enables results to be more conveniently obtained.

The two meters can be obtained separately for individual installation as heretofore—the fundamental selling arrangement of either manufacturing concern has not been disturbed:—this new type, the Lincoln-Sangamo UNIT, has simply been added to **the selling lines of both companies.**

Write for full information regarding the unit. Address either The Sangamo Electric Company of Canada, Ltd., Toronto, or The Lincoln Meter Co., Ltd., Toronto. You will be obligated in no way.

Lincoln-Sangamo

DEMAND ENERGY

meter

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Rubber Covered Wires and Cables

FOR POWER, LIGHT AND TELEPHONE WORK

Incandescent Lamp Cord, Flexible Switchboard Cables, Special Cords and Cables for all kinds of Electrical Work.

Prompt Shipments from Canadian Factory.

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Canadian Office and Factory, HAMILTON, ONT.

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LORICATED

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Barber-Ellis Building, Toronto

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The most perfect interior construction conduit on the market. Recognized as the standard of high quality.

Always specify Galvaduct or Loricated CONDUITS

"LORICATED"

A high-class interior construction conduit of the enameled type, proof against acid or other corrosive agents.

If your jobber cannot supply you—write us.

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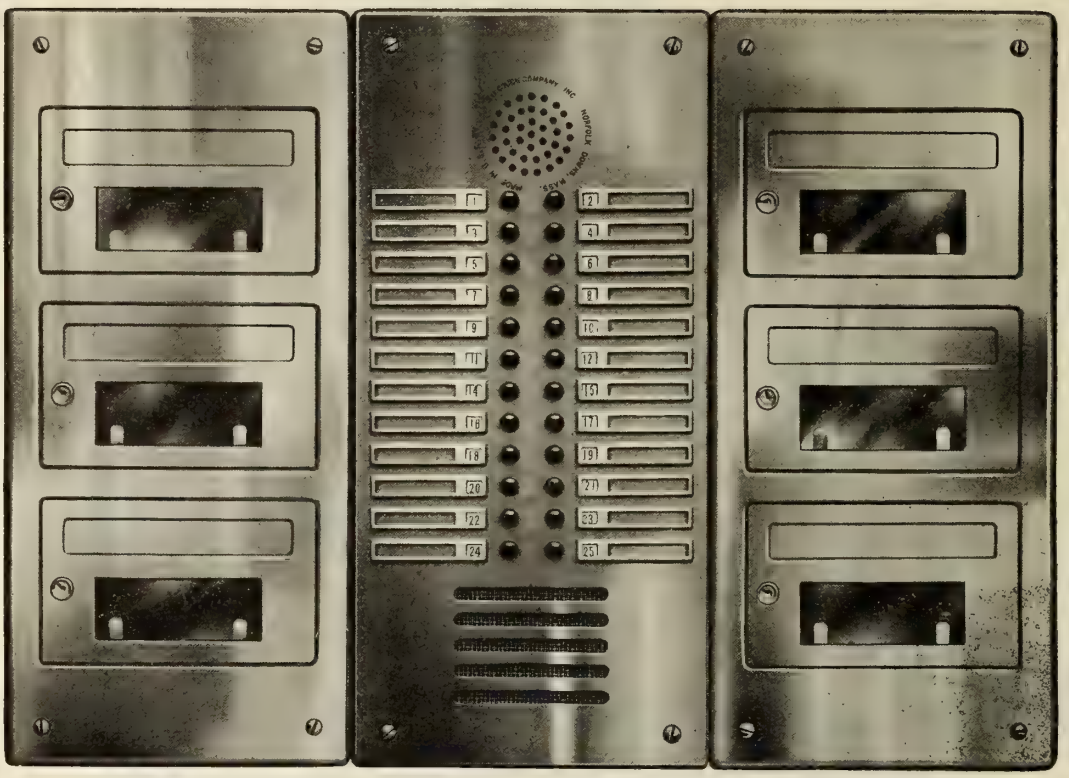
Western Sales Office: 602 Avenue Building, Winnipeg

COUCH

Apartment House Telephone System



Cordless Type Vestibule Outfit

The making of Telephone Systems for Apartment Houses, Schools, Colleges and Commercial Institutions, is no side issue with the S. H. Couch Company.

Their manufacturing and engineering activities in this one and only field, covers a period of 27 years and today they are the largest exclusive manufacturers of interior telephone systems. Every Couch instrument is the embodiment of all that is best in telephone engineering practice.

As their Canadian Representatives, we aim to give prompt and intelligent service and our prices should prove interesting to you.

We solicit your inquiries and will be glad to mail literature.

Eastern CanadianRepresentatives

G. L. MacGillivray & Co., Limited
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Which would you buy?

—the small and compact time piece of course.

Then why not buy

Ferranti Small Precision Type Watt-Hour Meters

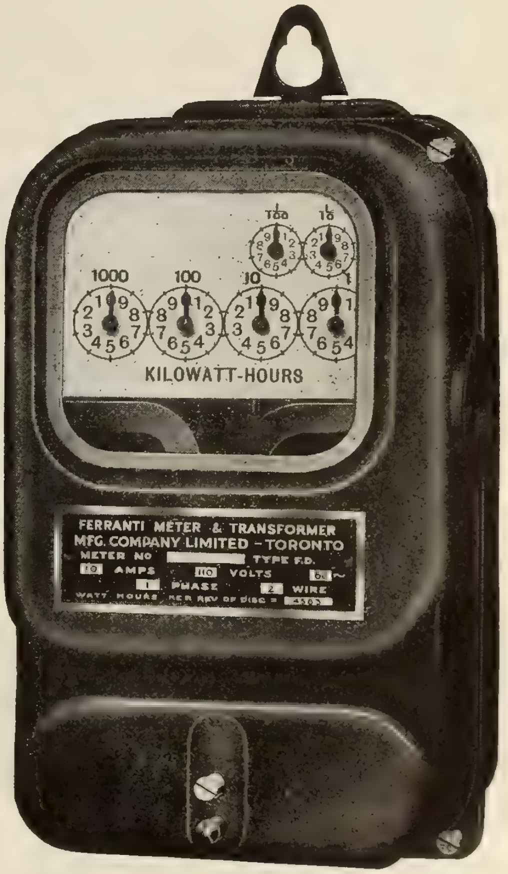

1000
100
10
1
1/100
1/10
KILOWATT-HOURS
FERRANTI METER & TRANSFORMER
MFG. COMPANY LIMITED - TORONTO
METER No
TYPE F.D.
10 AMPS
110 VOLTS
60 ~
1 PHASE
2 WIRE
WATT HOURS PER REV OF DISC =

Illustration shows Standard F.D. Meter half size

Ferranti F. D. Meters are accurate, reliable and durable, embodying simplicity of design and refinement of workmanship.

The features of this model are light weight, definite graduated-scale adjustments, large terminals and choice of clock or cyclometer dials.

Ferranti Meter and Transformer Manufacturing Co., Ltd.

26 Noble St., Toronto

Has a Crossbar That Cannot Get Out of Alignment

Unlike Fibre, This Rigid Steel Crossbar Cannot Char, Warp, or Split

The new 80000 Series has a steel crossbar whose satisfactory operation cannot be affected by heat or moisture. Even the best fibre bars will eventually char, split, and warp out of alignment. But the Square D steel bar with its sleeves of insulating material will withstand the most rigorous operating conditions —and continue to give a complete, positive, non-arcing contact.

A Long-Desired Feature

The Square D key permits authorized persons to inspect the switch without interrupting the circuit, to operate the switch with the cover open, or to lock the cover permanently shut. Without it, the cover cannot be opened when the switch is on or the switch closed when the cover is open. This patented cover control fully answers the demand for an enclosed switch that could be inspected without shutting down machinery.

Rapid Replacement of Parts

Current carrying parts can be replaced without removing base from box or disconnecting all wires. These are mounted on individual bases of moulded insulating material instead of the heavy, breakable, slate base. Any blade or jaw may be replaced from the front of the box in three minutes. That is a feature appreciated by all electricians as a time saver.

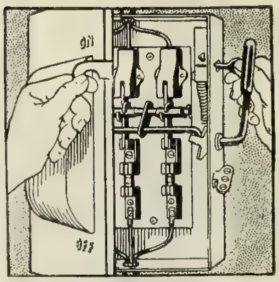
See this New Switch at Once

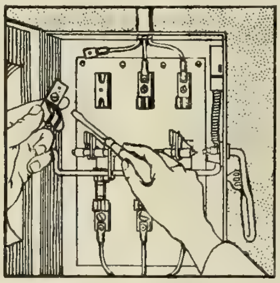
You should not delay in seeing this newest, safest, easiest-to-install switch that answers every switch requirement. Write our nearest office. A representative will call and demonstrate its numerous superiorities.

SQUARE D COMPANY, Walkerville, Ontario, Canada (19)

Sales Offices at Toronto and Montreal

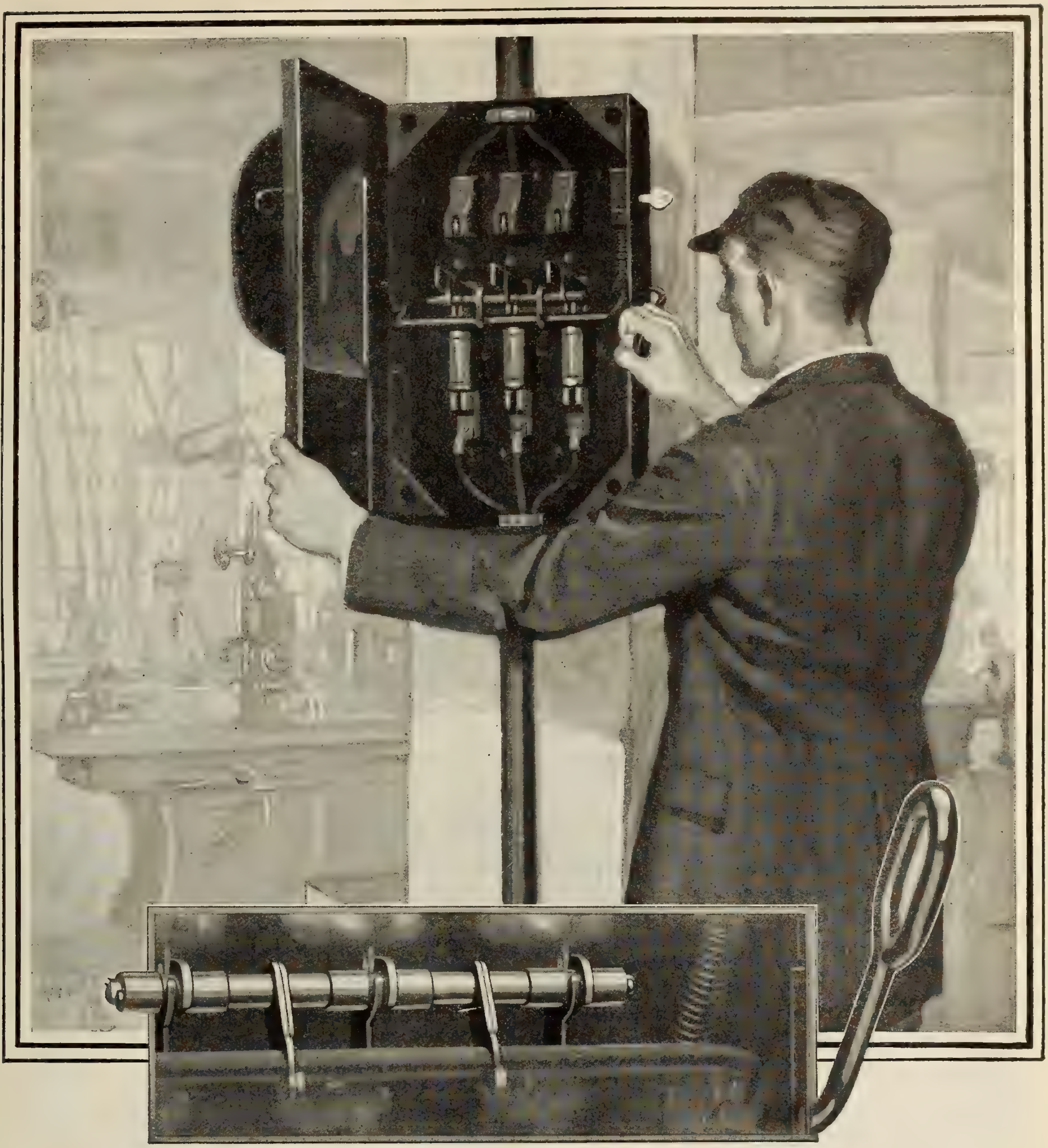
Only authorized persons having key can open the box when the switch is on





Individual bases permit removal of any blade or jaw in 3 minutes

SQUARE D



SAFETY SWITCH

D

Banfield - Levolier Pull Sockets

The best 660 watt pull socket ever offered to the trade. Priced moderately, made right. Improved snap shell fastening. Made in a number of different styles as to caps and shells. Your jobber has them in stock.

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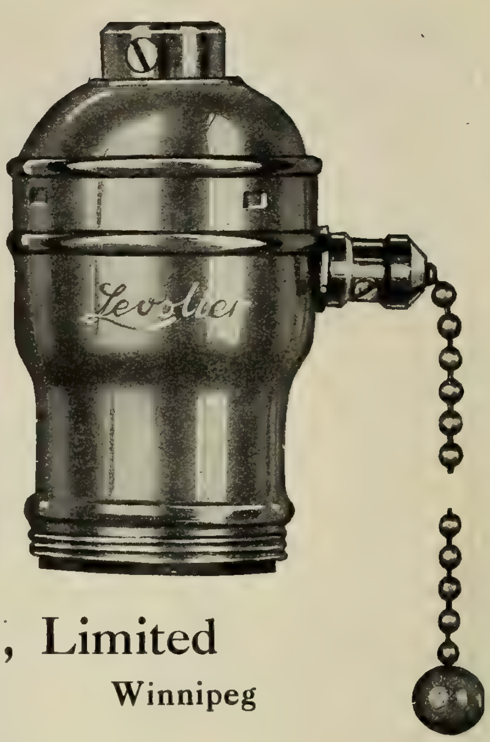
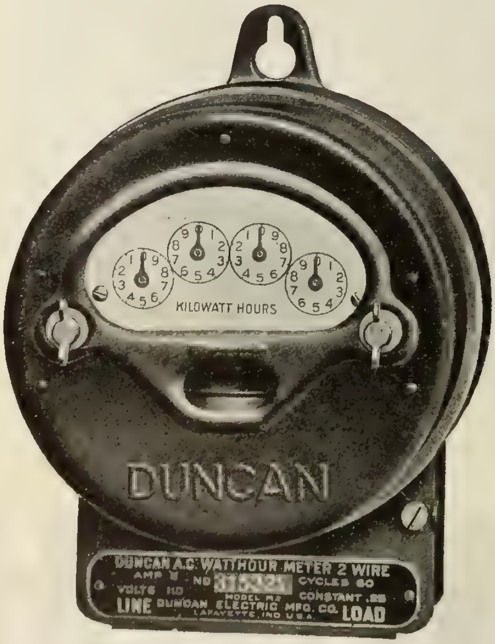




DUNCAN

Model M 2

IS A

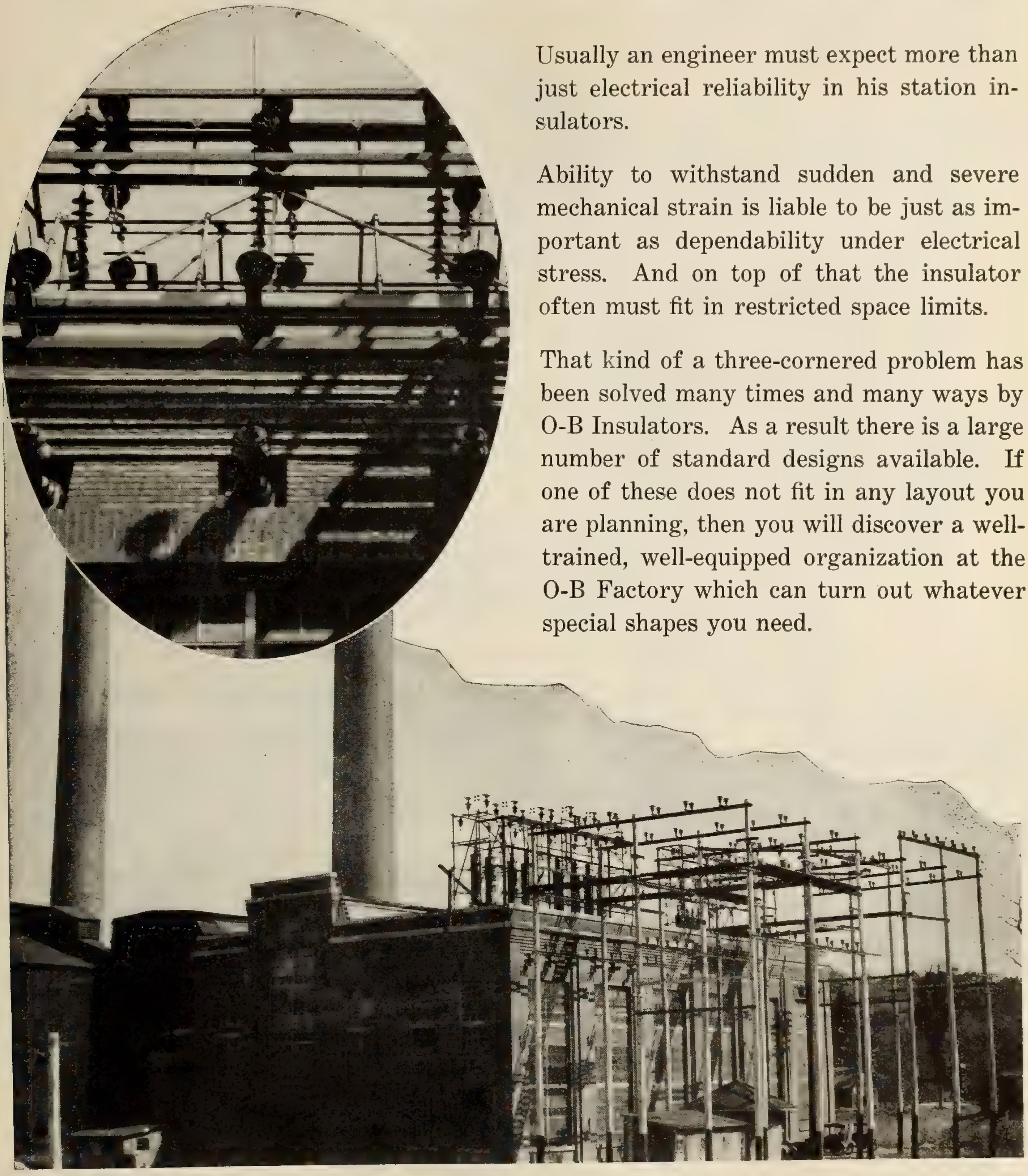
TIME SAVER

THEREFORE
A

MONEY SAVER

Bulletin 110

THE GEORGE C. ROUGH SALES CORP'N. 134 CORISTINE BLD'G.
MONTREAL



Solving a three-cornered Problem with O-B Station Insulators

Usually an engineer must expect more than just electrical reliability in his station insulators.

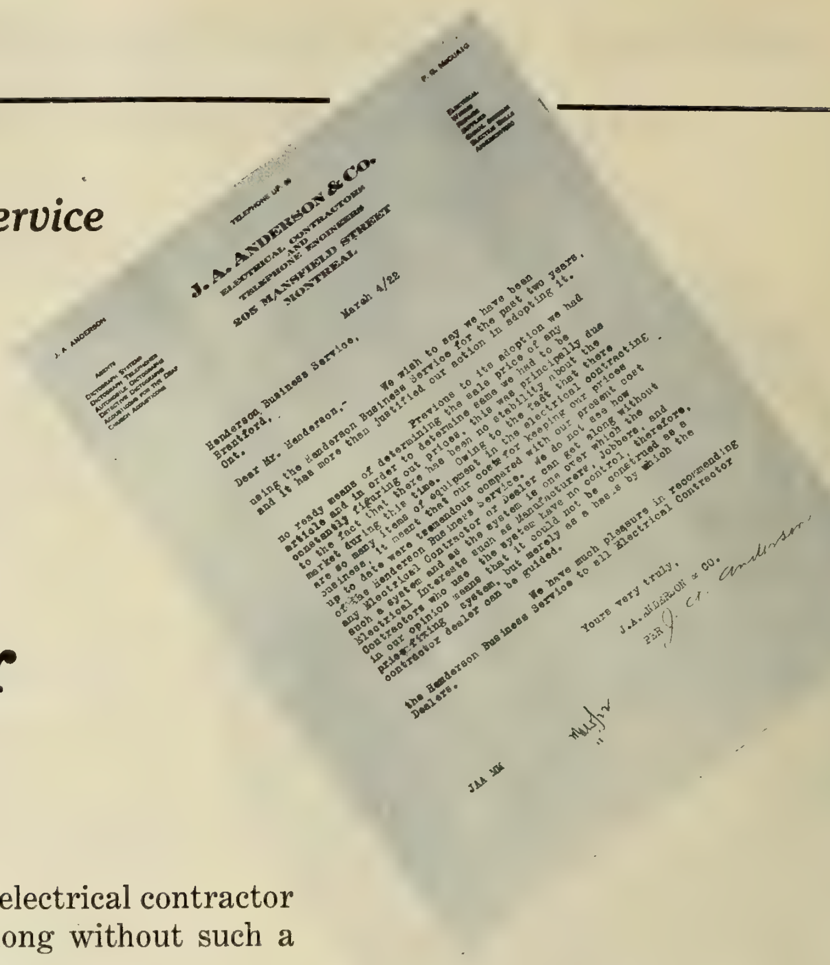
Ability to withstand sudden and severe mechanical strain is liable to be just as important as dependability under electrical stress. And on top of that the insulator often must fit in restricted space limits.

That kind of a three-cornered problem has been solved many times and many ways by O-B Insulators. As a result there is a large number of standard designs available. If one of these does not fit in any layout you are planning, then you will discover a well-trained, well-equipped organization at the O-B Factory which can turn out whatever special shapes you need.

The Ohio Brass Co.
Mansfield, Ohio, U.S.A.

What they say about Henderson Business Service

A Typical Letter



J. A. ANDERSON & CO.
ELECTRICAL CONTRACTORS AND TELEPHONE ENGINEERS
205 MANSFIELD STREET
MONTREAL

March 4/22

Henderson Business Service,
Brantford,
Ont.

Dear Mr. Henderson,-

We wish to say we have been using the Henderson Business Service for the past two years, and it has more than justified our action in adopting it.

Previous to its adoption we had no ready means of determining the sale price of any article and in order to determine same we had to be constantly figuring out prices. this was principally due to the fact that there has been no stability about the market during this time. Owing to the fact that there are so many items of equipment in the electrical contracting business, it meant that our costs for keeping our prices up to date were tremendous compared with our present cost of the Henderson Business Service. We do not see how any Electrical Contractor or Dealer can get along without such a system and as the system is one over which the Electrical Interests such as Manufacturers, Jobbers, and Contractors who use the system have no control, therefore in our opinion means that it could not be construed as a price-fixing system, but merely as a basis by which the contractor dealer can be guided.

We have much pleasure in recommending the Henderson Business Service to all Electrical Contractor Dealers.

Yours very truly,
J.A.ANDERSON & CO.
PER J. A. Anderson

JAA MK

WE do not see how any electrical contractor or dealer can get along without such a system," says Mr. Anderson.

Isn't that pretty convincing testimony from a user of two years' standing?

Another contractor writes, "We have found this book excellent in our line and would feel lost if we did not have our Henderson's to refer to."

From a Windsor, Ontario firm. "We have found the Henderson Price Book to be a God-Send. It is very complete and the publishers are willing to receive suggestions at all times. It is being used by nearly all the contractors in this section and by the Hydro."

And so on. Hardly a day goes by but we receive similar letters. They prove beyond a doubt that the Henderson Price System is all that is claimed for it—that it should be part of the equipment of every electrical contractor or dealer.

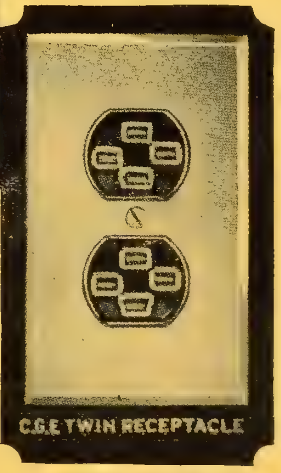
The cost is only seventy cents a week. This includes a leather-covered, loose leaf Price Book containing the correct retail price of over 2,000 electrical articles, also a table of rates per outlet for ordinary house wiring and another covering the installation of Range Services. Complete new change sheets are issued as often as prices change.

A postcard will bring complete details explaining everything

The Henderson Business Service, Limited

Box 123 **Brantford, Ontario** **Bank of Toronto Building**

Since men and women know that electricity adds so much convenience to their homes, it is reasonable for them to insist upon getting it



No!—my house must have modern wiring

Many a builder has wished he had given more thought to the final touches of convenience which he might very easily have put into a house—the little touches which mean a great deal to home-buyers, especially women.

In these days when women do so much of their housework electrically, many a house has been sold on its wiring alone.

C. G. E. Wiring Devices are the outgrowth of years of intimate knowledge of the requirements of house-owners. There are over 3,000 C. G. E. devices, covering every possible requirement.

All of them are good-looking, blending well with the architecture. They are so sturdy that they will last as long as the house itself.

It is to your interest to show the builders of your neighborhood the sales-getting possibilities of adequately wiring their houses. Electric homes will be more and more in demand during the next few years.

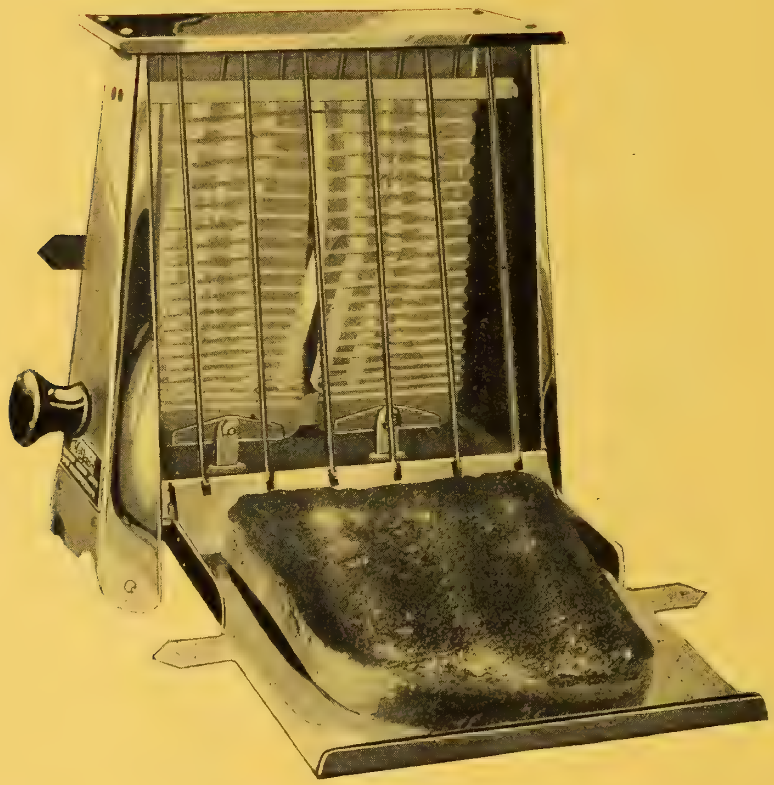
"Made in Canada"

Canadian General Electric Co., Limited

HEAD OFFICE TORONTO

Branch Offices: Halifax, Sydney, St. John, Montreal, Quebec, Cobalt, Ottawa, Hamilton, London, Windsor, South Porcupine, Winnipeg, Calgary, Edmonton, Vancouver, Nelson and Victoria.

Hotpoint



REVERSIBLE TOASTER

"Turns the Toast Without Handling"

Women demand guaranteed merchandise. The enviable reputation that all Hotpoint appliances enjoy, enables you to sell this new toaster to your most fastidious customers, and to realize that you are selling merchandise beyond reproach.

The new Hotpoint reversible Toaster retains the sterling qualities of all Hotpoint appliances, and adds the new reversible feature. The bread is turned over without handling, kept hot and toasted evenly. Supplied with a Hotpoint interchangeable cord and plug.

"Made in Canada"

Canadian General Electric Co., Limited

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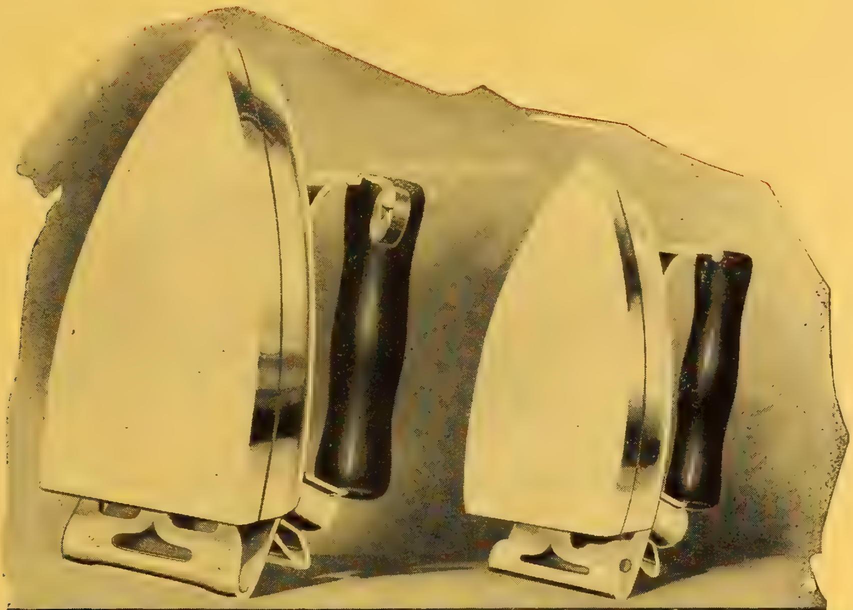
Hotpoint



—both Hotpoints—the smaller one is for the finer work

A Few Reasons Why It Pays You To Standardize On This Famous Iron

1—The Hotpoint Iron is the standard by which all other electric irons are judged.

2—There are over a quarter of a million satisfied users in Canada.

3—It is nationally advertised.

4—It will create prestige for you among your customers.

5—Once sold it stays sold.

6—It allows you a good margin of profit with a much quicker turnover than any other iron on the market.

"Made in Canada"

Canadian General Electric Co., Limited

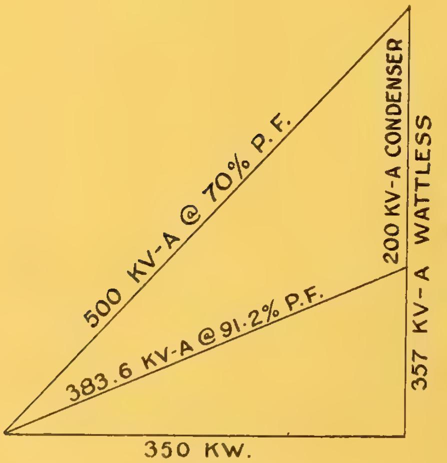
HEAD OFFICE TORONTO

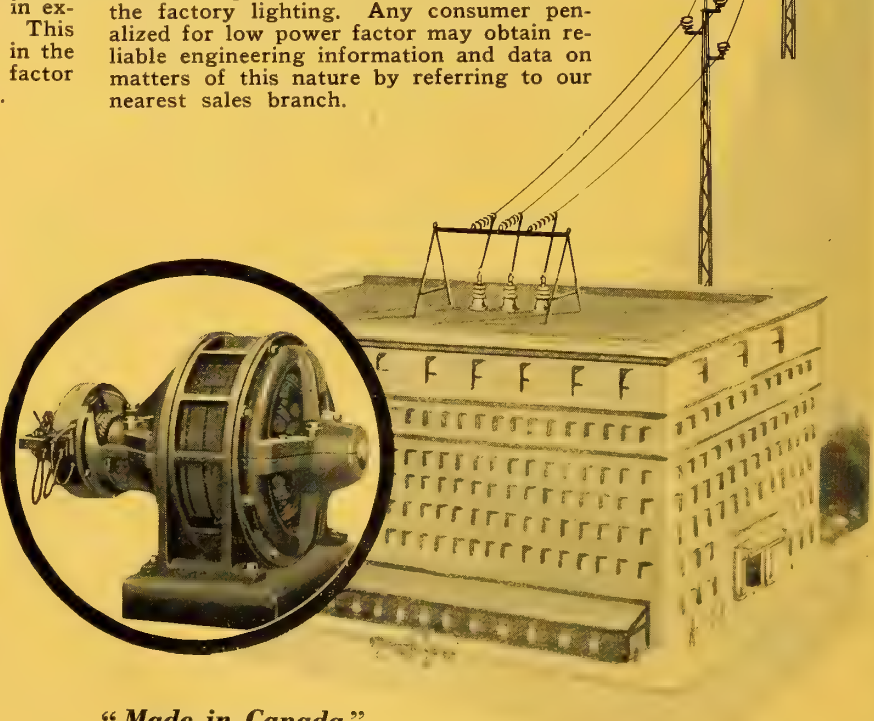
Branch Offices: Halifax, Sydney, St. John, Montreal, Quebec, Cobalt, Ottawa, Hamilton, London, Windsor, South Porcupine, Winnipeg, Calgary, Edmonton, Vancouver, Nelson and Victoria.

Why Is Low Power Factor Penalized?

A factory load of 350 Kw. at 70% power factor requires station equipment and transmission line capacity, that at 100% power factor would deliver 500 Kw. To compensate the Central Station for the 150 Kw. of plant rendered unavailable for revenue by the low power factor the consumer is charged an amount, and properly so, in excess of his bill for energy used. This charge in excess of the power bill is in the nature of a penalty for low power factor and is a 100% loss to the consumer.

The installation of a C.G.E. Synchronous Condenser of 200 Kv-a. capacity would, as shown in the diagram below, bring the power factor up to above 91%, that is, above the penalty point, would reduce the power bill by the amount of the penalty and in addition improve the voltage regulation and the factory lighting. Any consumer penalized for low power factor may obtain reliable engineering information and data on matters of this nature by referring to our nearest sales branch.





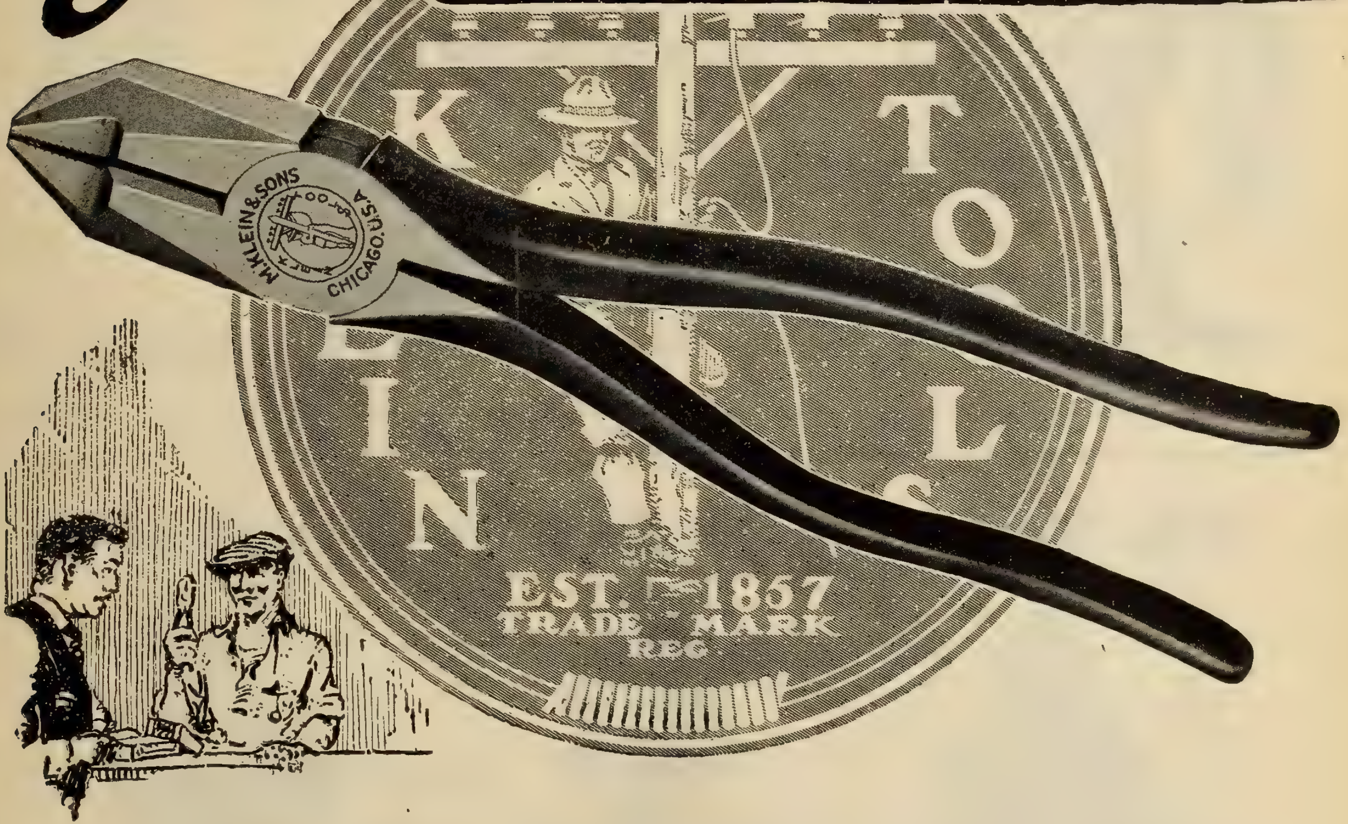
"Made in Canada"

Canadian General Electric Co., Limited

HEAD OFFICE TORONTO

Branch Offices: Halifax, Sydney, St. John, Montreal, Quebec, Cobalt, Ottawa, Hamilton, London, Windsor, South Porcupine, Winnipeg, Calgary, Edmonton, Vancouver, Nelson and Victoria.

They're made by **KLEIN**



That simple statement regarding a plier means that 65 years of quality tool-making has gone into the manufacture of the tool. It means that the plier has been hammer-forged from the finest of special bar steel.

It means that every precaution has been taken to give the knives just the right temper, for which Klein Pliers are famous.

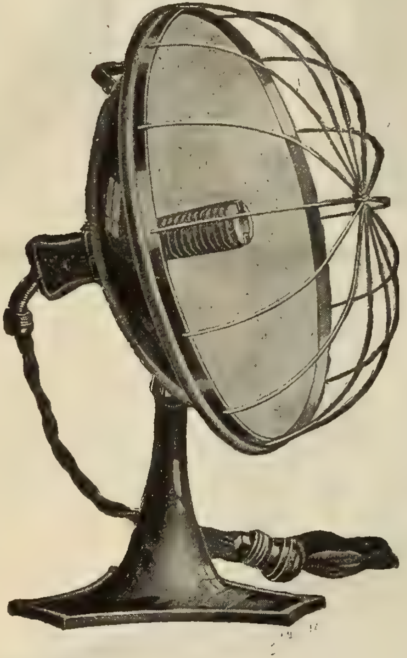
It means that designing and re-designing has given that curve to the handles which makes them sit so comfortably in the hand—that each process of its manufacture has been subject to the most rigid inspection—that it is a man's tool for a man-sized job!

Equip your gangs with pliers "Made by Klein!"

Mathias KLEIN & Sons
Established 1857
Chicago Ill. U.S.A.

EQUATOR ELECTRIC HEATERS

Approved by Hydro Electric Power Commission



EQUATOR HEATER

Cat. No. A17—8 in. reflector

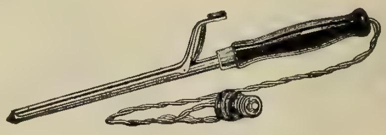
LIST $7.50

Round Toaster Stove
List $4.00

EQUATOR HEATER

Cat. No. A7—12 in. reflector

LIST $9.50

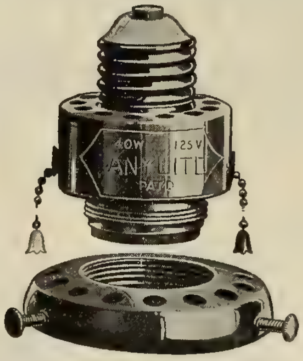


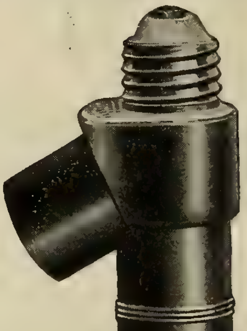
Curling Iron
List $4.25

Shipments from stock
Generous discounts

Equator Manufacturing Co., Ltd., Hamilton, Ont.

A Big Demand Exists for these New Anylite Products





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Twin Socket

Cold molded composition with vulcanized fibre tubes.

Practically unbreakable.

Will not soften or melt with heat.

Bus Bar construction with Spring Point connections.

Small, compact, neat.

Can be screwed up inside shade.

Regulator (Improved Type)

Twenty different lights.

Very easily and smoothly operated.

Strong beaded brass chain.

Ventilated construction.

Absolutely guaranteed.

N.B. These regulators are mounted on cards of ten. The new cards are forceful silent salesmen wherever displayed.

T.P. 2 Plug

Bulb held in vertical position, while appliance is connected to one side.

Threaded for standard shade holders.

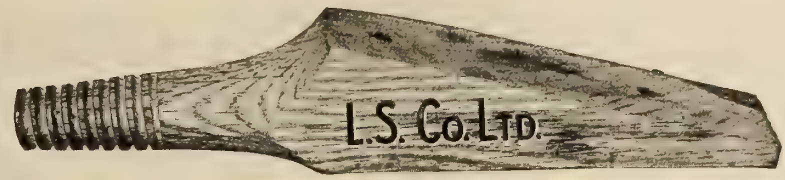
Same durable construction as Twin Socket.

Dealers please order from your Jobber (or write to us direct)

Dominion Carbon Brush Company, 38 Duke St., Toronto

E. W. Playford, 619 New Birks Bldg., Montreal

Canadian Agents for Anylite Electric Co., Fort Wayne, Ind.



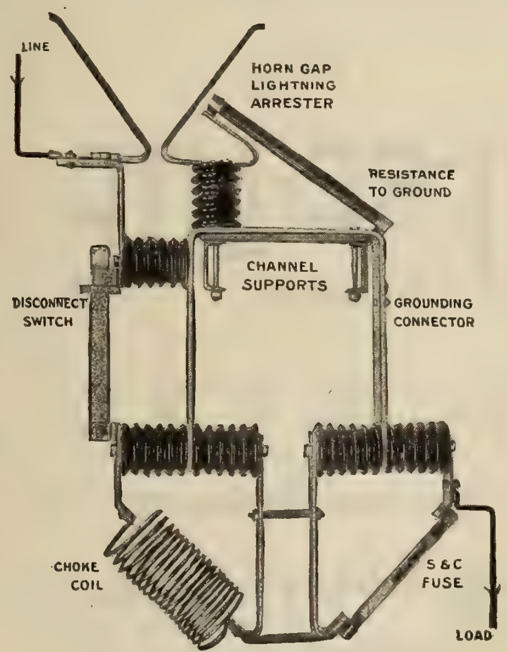
We are manufacturers, in a large way, of

TOP PINS, SIDE BRACKETS, POLE STEPS AND CROSS ARMS

We have been supplying this pole line material for years, from coast to coast, to the largest telephone, telegraph and electric lighting systems.

Our goods are specified where efficiency and economy are measured by actual results and not by purchase price only.

THE LACHUTE SHUTTLE CO., LIMITED
Lachute Mills, P. Q.



ONE SINGLE POLE "XW" UNIT
Horn Gap Arrester with Series Resistance to Ground, Disconnecting Switch, Choke Coil and "S & C FUSE" Mounting.

Simplified Substations with Complete Protection

for small and moderate loads for Rural Service, Small Towns, Industrial plants, etc.

The Economy and Simplicity of these Compact Assembled Units is at once apparent.

They are made in single pole, two pole and three pole combinations mounted on galvanized structural steel supports ready for your poles, with or without rod for operating switches from the ground.

7500-15000-25000-37000 Volt Service

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SCHWEITZER S&C CONRAD, INC.
4435 RAVENSWOOD AVENUE CHICAGO, ILLINOIS U.S.A.

Carbons for Electric Arc Welding

THE electric welding industry has been tremendously advanced by the high development of arc carbons for specific purposes. We manufacture the following grades, named in the order of their current carrying capacities:—

Plain Welding Carbon:
A hard carbon for Ordinary service.

Columbia Welding Carbon:
Very hard. It can also be furnished copper coated, making it suitable for use as a cutting electrode as well as for heavy welding work.

Special Graphite Welding Carbon:
Rather soft and graphitic. High conductivity. Used where a high amperage is required. Used with excellent results on general work.

CANADIAN NATIONAL CARBON CO.
LIMITED
TORONTO - CANADA

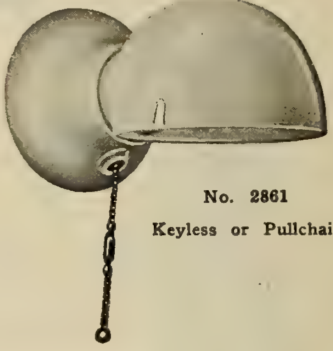
C N C

2332

VITROLITE

Patents Applied For

No. 2862


No. 2861
Keyless or Pullchain

A complete new line of Sanitary Fixtures for bathrooms, kitchens, hospitals, etc.

Exposed metal parts are white vitreous (porcelain) enamel, which will not discolor, crack or peel, and is absolutely clean and sanitary, besides harmonizing perfectly with the surroundings. The reasonable prices will surprise you.

Write for particulars

Tallman Brass & Metal Limited
HAMILTON, ONT.

The U-RE-LITE Exhibit

From the C. N. E.

May now be seen at

24 Adelaide St. E.,

TORONTO.

The CUTTER COMPANY
ESTABLISHED 1888 PHILADELPHIA

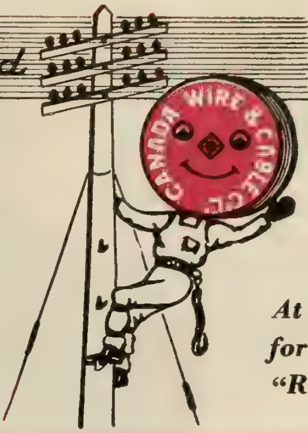
24 Adelaide St. E., TORONTO

Canada Wire & Cable Co. Limited

Halifax Montreal Toronto Regina
Winnipeg Calgary Vancouver

Electric Wires and Cables

Copper
Bare, Weatherproof, Rubber Covered
Steel Wire Rope


CANADA WIRE & CABLE CO.

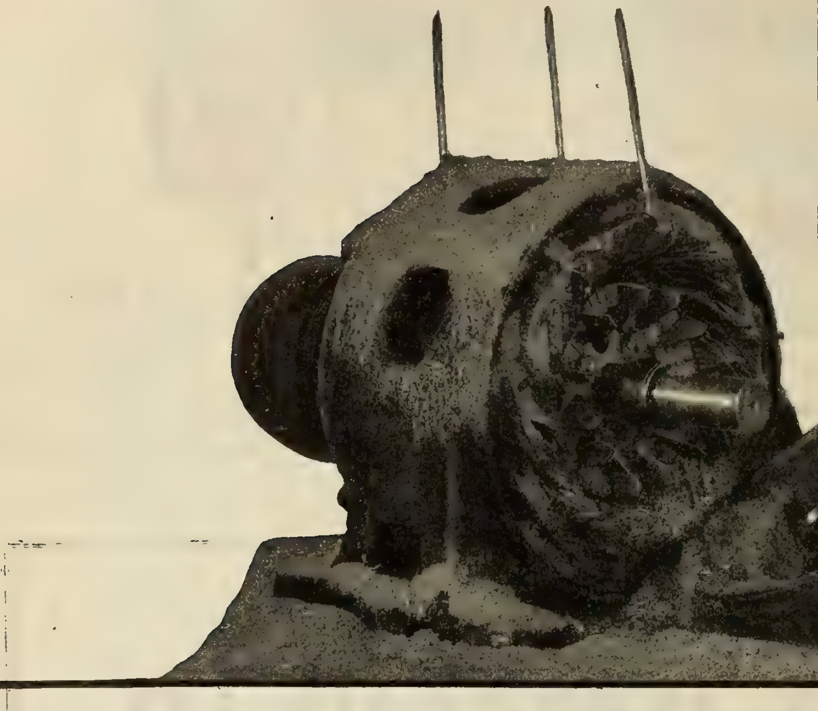
At the top
for
"Reel Service"

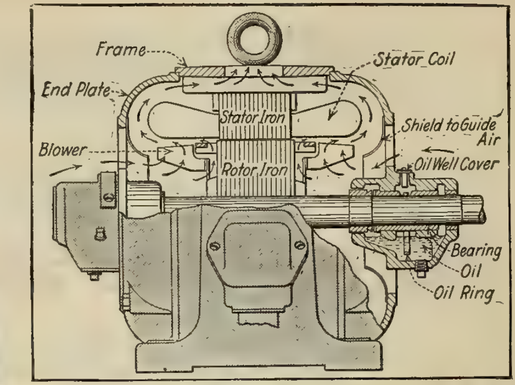
CANADIAN PORCELAIN CO.
LIMITED
HAMILTON - CANADA

Manufacturers of High and Low Tension Porcelain Insulators

The Star Porcelain Company
TRENTON, N. J.

Manufacturers of Electrical Porcelain Specialties. Also specialize in the manufacture of heater bricks for electric ranges.





Illustrating the passage of the air through the Pow-R-full Motor. It will be seen that all parts where heat is produced are bathed with currents of cooled air.

The Wonderful Directed Draft Feature Makes This Possible

SAWDUST, handful after handful, was *thrown* into this Pow-R-full Motor through every possible opening. The purpose was to test the directed draft feature which its designers claim to be so wonderful.

After one hour the temperature rise became constant. Then an additional hour was spent in "feeding" more sawdust. As fast as it was fed, the motor threw it out. The temperature rise—entirely within the limit of safety—did not increase during the latter period and the motor was still running smoothly.

As the test proved, the directed draft feature of the Pow-R-full Motor is all that its designers claim.

Bulletin 12913 illustrates and describes the many unique advantages of the Wagner Pow-R-full Motor. Ask for a free copy.

Wagner Electric Manufacturing Company
of Canada Limited–Montreal
Power Building, Montreal 217 Dundas St. East, Toronto

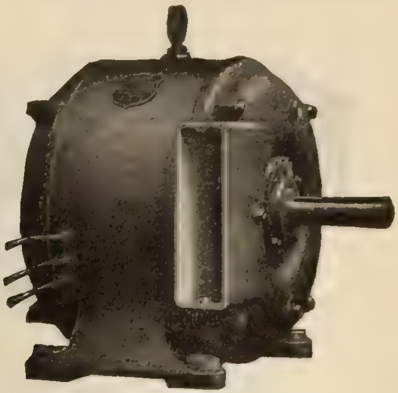
2615

Wagner Quality **Pow-R-full Motor**
Polyphase – Heavy Duty – 40°

The "Lancashire" Induction Increases Production

LANCASHIRE
BALL BEARING
MOTORS

LANCASHIRE DYNAMO & MOTOR CO. (of Canada) LTD.
TORONTO MONTREAL



Lancashire Pipe-Ventilated Motor. For use in Cement & Flour Mills, etc.

MOLONEY TRANSFORMERS

RELIABLE AND EFFICIENT

Reliability under the severest conditions has always been one of the most desirable features of MOLONEY Transformers. That they are also efficient and give long service is proved by their ever increasing use from coast to coast. Let us send you full particulars.

MADE IN CANADA

MOLONEY ELECTRIC COMPANY OF CANADA, LIMITED

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Windsor, Ont.

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To the Electrical Contractor

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We are now in a position to furnish a complete line of POWER equipment including Robbins & Myers' Motors and Sundh Electric controlling devices. We are also Ontario Sales Agents for Rawlplugs.

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D. M. Fraser, Pres.
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Exide

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EXIDE BATTERIES OF CANADA LIMITED

At the Entrance to the Canadian National Exhibition

For Every Purpose

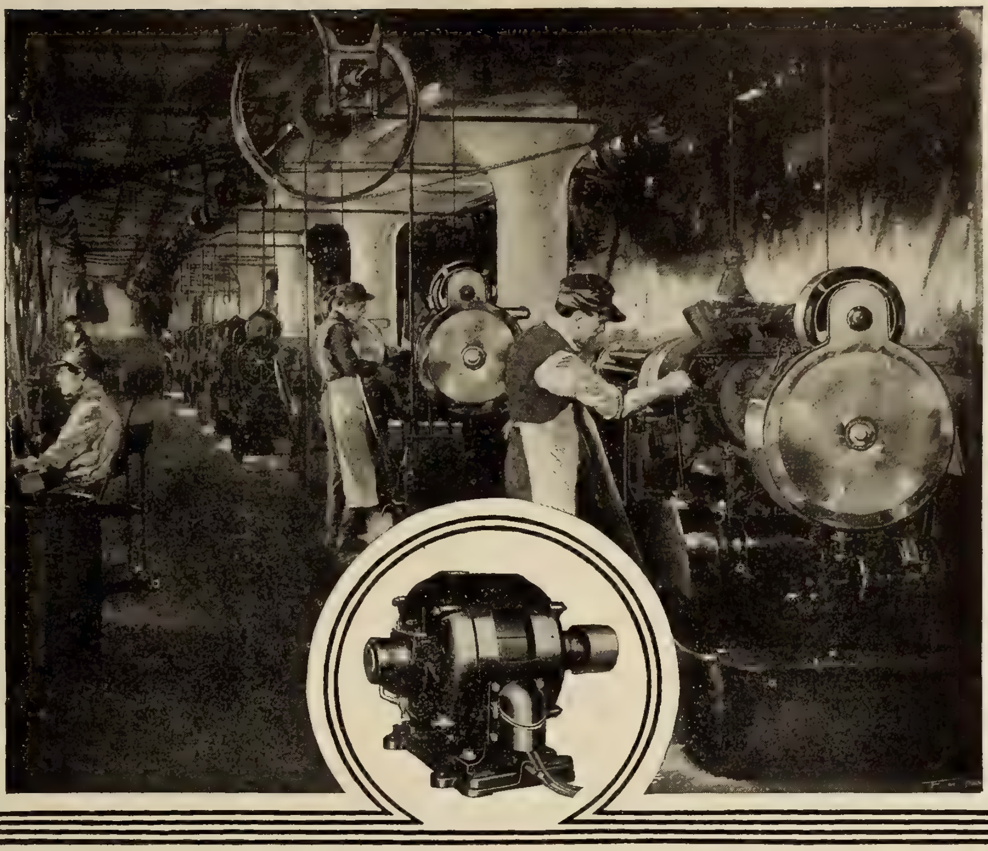
Scores of great industries rely on the willing power of Exide Batteries.

Exides propel mine locomotives and trucks; they light railway trains, operate switches, provide current for the telephone system and in many other ways play an active part in the daily life of the Dominion.

All types of Exide Batteries for all purposes are sold by Exide Batteries of Canada, Limited. You are invited to take up with us any battery problem that may arise in your business.

Exide Batteries of Canada, Limited

153 Dufferin Street, Toronto



IN the large factory where operations are scheduled just as carefully as trains are despatched on the great railroad systems, power reliability is an all important factor. A failure of one department or one group of machines affects the schedule throughout every department of the plant, often resulting in costly delays and loss of production.

That is one reason why R & M Motors, once they are given a trial in such plants, are invariably given favorable consideration when additional motors are needed. Their rugged construction, liberal rating and low temperature rise, keep them on the job and win the approval of every man who has to do with production, from the production manager down to the individual laborers at the machines.

The Robbins & Myers Company of Canada, Limited

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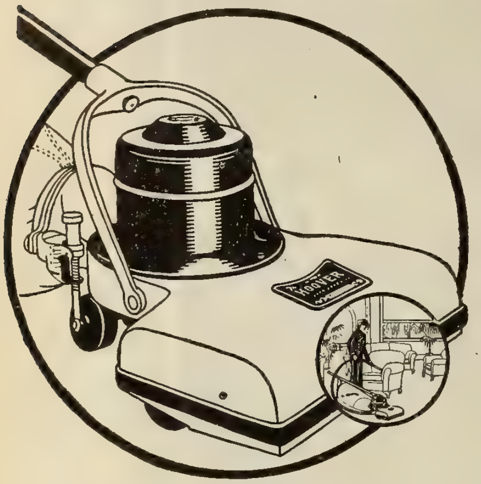

Partial view of the wonderful new Hoover, Model 961. Sturdy and durable. Requires no oiling. Quiet running. Easy to operate. Ball bearings throughout. Weighs only 29 pounds. Retails at $155, east of Rockies. Attachments, $16.50

After several years of experimentation and study, the new big Hoover, Model 961, is ready.

It introduces a new era in the sale of electric cleaning apparatus for use in large residences, dormitories, institutions, stores and fine shops, as well as hotels, clubs and offices.

There is nothing to rival it, either for economy or efficiency. It far surpasses all installed plants. It outclasses all other portable cleaners.

Practically "Fool Proof"—rough treatment or neglect can not harm it. Built for continuous heavy work. No skill required to operate it.

No Oiling Required—forgetting to oil the motor can never cause trouble. This new quiet-running Hoover has a *ball-bearing, dust-proof* motor made for us by the General Electric Company.

Operates on Direct or Alternating Current—without change and at a uniform speed. Therefore, the dealer need stock only one model.

Very Light in Weight—weighs only 29 pounds. Glides easily; all-day use will not tire the operator.

Other Exclusive New Features include a ***ball-bearing*** Beating-Sweeping brush, a wider cleaning mouth, a non-marring fibre handle grip, and a new device which adjusts the cleaning mouth and automatically locks it at the proper cleaning height for carpets of different thickness.

Cleans Thickest Rugs

Especially designed to clean even the heaviest, thickest rugs, the new Hoover beats out all nap-wearing grit, sweeps up all clinging litter, erects crushed nap, freshens colors and cleans by powerful suction.

So easily is it shown that The Hoover imparts to carpetings a longer lifetime of wear that a strong argument can be built around this fact.

In many instances the value of carpets run into thousands of dollars. The replacement of these is a heavy and frequent expense. The Hoover will pay for itself repeatedly by saving this cost. Furthermore, any prospect with whom cleaning is a costly matter can readily be shown that savings in labor will also quickly pay for each Hoover purchased.

Attachments Easily Connected

A new, easily connected "converter" allows the greatly improved Hoover air-cleaning attachments to be easily used. Extremely strong suction is provided.

Profits Are Large

Authorized Hoover Dealers have, in this fine new Hoover, an unprecedented opportunity to add greatly to their profits.

In numerous cases, a number of these cleaners can be sold practically without competition.

Write us today. Production of this new model is in full swing.

THE HOOVER SUCTION SWEEPER COMPANY OF CANADA, LIMITED
Factory and General Offices: Hamilton, Ontario

The HOOVER

MADE IN CANADA

It BEATS.... as it Sweeps as it Cleans

Electrical News
Generation, Transmission and Application of Electricity

For nearly thirty years the recognized journal for the Electrical Interests of Canada.

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Starts Nowhere—Ends Nowhere!

The electrical industry is, in fact, a very complete, compact organism. To the visitors at the great "Fair" however. it must appear entirely disjointed and disorganized. It is everywhere and yet it is nowhere. Every other industry is dependent upon it, yet electricity gets no credit—no "kudos."

The so-called electrical building is almost a joke. It gives the visitors an entirely erroneous idea of what electricity really means. The building itself is unsuited to the needs of the industry and it is badly located. The electric (?) sign over the entrance would be about suitable for an Italian shoe repair shop. Poor judgment has been exercised in the selection of exhibits; for example, one of the most prominent booths is occupied by a lightning rod man whose noisy demonstrations consist in producing some spectacular miniature lighting flashes. These have not the slightest meaning for the open mouthed spectators, who carry away the idea that electricity is chiefly a matter of flashes and sparks and "terrible dangerous" as one old lady remarked. This exhibit is entirely out of place.

Then, only a small fraction of the electrical exhibits are found in this building. The attractiveness of other buildings is so much greater, and the environment so much more productive of interested inquiries, that a very large number of firms, while quite sympathetic with the general idea of segregating the electrical industry, yet feel that they cannot afford to give up locations they have held before, in some cases for years, until something better than the present electrical building is provided elsewhere.

We understand the secretary of the electrical manufacturers' Association is making a move to determine the viewpoint of the members on the matter of a new building for next year. The problem does not appear to be a difficult one. The management of the exhibition has definitely stated that all they require is a guarantee over a term of years that the full space will be occupied. They are then prepared to provide the money and go ahead with the erection of a building—anything the industry wants, practically. Unless we lack faith in our own industry and its future development we surely need not hesitate to look forward far enough to guarantee occupying as much space at the Canadian National Exhibition for the next ten years as we occupy to-day. Unless all signs fail, the end of that period will actually see us demanding many times the present requirements.

There is little doubt that the idea of a new and permanent building, centrally located, will appeal to all manufacturers and wholesalers. That being the case the next thing is **action.** Some one person or a small committee, should be specially charged with preliminary negotiations, preparing plans, etc. If action is taken at once we can have our own home next year. The Electrical Industry surely cannot afford to remain longer in disgrace.

All Together For 1923!

Shall we have an Electrical Building in the Big Canadian National Exhibition next year? The electrical manufacturers are moving in that direction and Mr. J. A. McKay, their general secretary, has sent out a questionnaire. All the replies are not yet received but it looks like a big majority vote in favor of going ahead at once.

In addition to other arguments in favor of immediate action is the fact that available space for building on is being rapidly taken up. A good location is important. Mr. McKay's letter—containing interesting information—and his questionnaire, is given below:

Re: Canadian National Exhibition

Dear Sirs:—

It has been the concensus of opinion of all engaged in the electrical industry, be it as Manufacturer, Jobber, Contractor-Dealer or from the Central Station point of view, that the present facilities provided at the Canadian National Exhibition for the housing of exhibits, etc., have in view of the importance of the industry, been very inadequate during recent years.

Representatives of the industry recently approached the Exhibition authorities on this subject and were informed that if at any time the industry as a whole showed that it was ready to support the Exhibition authorities if a suitable building were provided, they, the officials, were prepared to proceed with the erection of such a structure on a proper location. The representatives were further informed that on the cost basis of other buildings recently erected, a building in keeping with the needs of the industry could be erected on the basis of an assured rental of approximately 65 cents per square foot per annum.

Mr. A. S. Edgar of the Canadian General Electric Company. Mr. C. H. Keeling of the Square D Company, and Mr. A. MacKenzie of the Canadian National Carbon Company have recently been appointed a Committee to obtain the views of the members of the different branches of the industry, and in order to obtain a complete survey, have prepared a questionnaire, copy of which is herewith enclosed, and which you are respectfully requested to complete and return to the office of the Electrical Supply Manufacturers' Association, 24 Adelaide Street West, Toronto.

If sufficient interest is shown in the matter, it is intended to have a Main Committee formed which will be representative of all branches, to carry negotiations to completion.

If our plans carry it is proposed to incorporate in the building a Model Electric Home which will be operated by the Electric Home League, and which will remain a permanent feature, and to which proper publicity will be given. This, in itself, will serve as a permanent attraction and incentive to all who attend the Exhibition to visit the Electrical Building.

It has been suggested that 1923 should be "Electrical Year" at the Exhibition, and therefore, the erection and opening of the new Electrical Building during the Exhibition of 1923 will be most opportune.

Yours very truly
J. A. McKay
General Secretary

Questionnaire

1. Do you regularly exhibit at the Canadian National Exhibition
2. If not, have you ever exhibited?
3. If you did not exhibit in 1921, when did you last make use of space?
4. (a) Give approximate area of space used during the last Exhibition at which you were represented.
   (b) Rent per square foot paid.
5. If an exclusive Electrical Building is erected on a suitable location for opening in 1923, how many square feet at an annual rental of 65 cents per square foot for a term of ten years could be made use of by you.

(A reply to this question does not in any manner obligate you.)

Name....................................
Address..............................
Date.................

Annual Financial Review

The Annual Financial Review (Canadian) for the year ended June 1922 has just been issued by Messrs. Houston's Standard Publications, Stock Exchange Building, 84 Bay Street, Toronto. To the man or woman who has money to invest, whether in large or small amounts, this is a publication that may well pay for itself many times over during the year, for it is a carefully revised precis of facts regarding Canadian securities. The information contained includes the latest annual statements of banks. railways, public utilities, industries of every sort, loan and mortgage companies, mines, etc. Lists of bond and brokerage houses are also given, with the standard charges for buying and selling. In addition to the annual report of each company, there is also printed in nearly every case the record of the buying and selling transactions in the different stocks for a number of years, thus giving the investor an opportunity to judge, at a glance, whether the past history of a stock is such as to make it a suitable investment for his particular needs.

Contrary to the opinion held by most inexperienced investors, comparatively few fortunes are the result of speculation. Insurance companies tell us that 95% of our population are more or less dependent upon their relatives in their old age; this in spite of the fact that perhaps 50% of our people have developed in a greater or less degree the saving habit and have placed their money at one time or another in what they believe to be "investments." The secret of old age dependence must, therefore, be due to the lack of knowledge about investments. For these reasons, it would appear that no person with money to invest could do better than pay $10.00 for a copy of this Annual Review and make a careful study of its contents. If an investor has large quantities of money at his disposal this expense represents an infinitesimally small portion of the savings that may be effected through accurate knowledge. For the small investor, who's all is counted in thousands. it goes without saying that a high factor of safety is of prime importance.

Interesting Contract with Charleswood, Man.

An interesting contract has recently been closed between the municipality of Charleswood, Manitoba, and the Suburban Rapid Transit Company, a subsidiary of the Winnipeg Electric Railway Company, whereby, three of the four wards of the municipality will be served with electric lighting facilities immediately; the other ward, which is purely rural, will be connected up as soon as developments justify.

The municipality as a whole is rather more rural than urban, and although only the Assinaboine River separates it from the municipalities of St. James and Assinaboia both of which for years have had a comprehensive distribution system, it was not commercially feasible for the company to extend into Charleswood without assistance of some kind.

It is undoubtedly true that whenever, and wherever, a pole line extension is made, the property along the route is materially increased in value; but unfortunately the company or institutions making the extensions, and directly responsible for increasing land values, are not in a position to capitalize on such increasing values even to offset the deficits that very often exists for years after extensions have been made.

The company realized in this case, that for a considerable time deficits would be made unless the expense of the distribution costs could be shared, and that it is the municipality itself that is in the logical position to share in the intial expense by virtue of its being in a position to capitalize on increasing land values. The Council of the municipality were asked to agree to a scheme of joint ownership of the distribution system within the municipality. This they agreed to do, and signed a fifteen year contract subject to renewals for further periods of ten years each.

According to the contract the company undertakes the erection of all the work, but the municipality pays the company for all the labor and materials involved in the pole line (poles and conductors) charging the cost of same to the property owners under a local improvement scheme, the company being responsible for furnishing and placing in position all transformers, services and meters, also the maintainance of the whole system.

This joint ownership period lasts for five years from January 1st, 1923, thereafter, the company undertakes to purchase the municipality's portion of the system and to refund the money gradually but without interest until after two years from the date of purchase. It was felt that as the municipality had certain attractive features about it—geographically it is in the direction of probable developments, the taxes are unusually low and together with future extensions being regulated on a basis of a customers "per pole" in about five years time the system would be on a self supporting basis.

Among other interesting details of the contract for which Mr. Duncan G. Sutherland, power sales engineer for the company was responsible, is a clause to the effect that in the event of the contract not being renewed with the company after the first fifteen years or any renewal period, and the municipality desires to go into the business of furnishing electrical current for itself or permit any other firm or corporation to do so, the system at the option of the company must be bought out right by the municipality.

Opening of Galt's New Hydro Home

Sir Adam Beck Says Building Among Finest of Hydro System—Sub-station Part of Structure

An interesting event in the electrical world and one that further indicates the progress of hydro-electric development, has been the opening of the new building of the Hydro-electric Power Commission in Galt, Ontario.

The chain of events leading to this successful conclusion may be said to have commenced in 1886, when one of the first arc lighting systems on the continent was installed on the streets of Galt. House lighting was started on a small scale a few years later, and various extensions and improvements were carried out by the private companies operating this utility in the succeeding years. "Hydro" first came to Galt in 1911, and the first power bill paid by the municipality was for 93.9 horse-power, amounting to $195.00. The power bill for June, 1922, amounted to $6,883.80.

The steadily growing demand made it imperative that the sub-station, offices and merchandising section be centrally housed in a suitable building, with the result that the new Hydro building was erected.

Building Most Modern

The Public Utilities building is said to be not only the finest in the city of Galt, but also one of the finest in the Hydro system, combining all the most modern ideas in buildings for this purpose. The design of the exterior is what is known as the straight style—stone ornaments and the large show windows of the office building providing relief. The building is three stories in height throughout, of Ohio sandstone and brick construction, with the foundation of concrete and Queenston stone. It is the first all steel office structure to be erected in the district, with reinforced concrete floors and all of the interior construction carried on the steel frame work.

The office section of the building is entirely separate from the sub-station, the two being divided by a solid fire wall, with a stairway and elevator between the two departments enclosed in fire walls. The two sections are connected by fire-proof doors and each section has its own entrance. The basement of the building provides work shops for the waterworks and electrical departments, space for the rotary converter and storage batteries for the operation of the sub-station switch gear and for the heating plant for the building.

Appliance Section

The double entrance to the office section from Wellington and Dickson Streets, opens into a good sized vestibule which is in walnut finish. This leads into the show room and main office. This room is finished with a dado of grey marble, light grey stucco walls and an ivory tinted cement beamed ceiling. The floor is of Terrazzo with a ceramic tile border. The interior wood trim is in walnut finish with show-room fixtures and main office grill to match. The lighting is from Duplexalite fixtures.

As will be seen from the illustration of the show room, the appliances are placed with sufficient display space for each—no overcrowding is allowed. The development of this department only dates from 1921, and the venture has been very successful. At the present time "wiring" alone occupies seven electricians. The demand for electric ranges is especially noteworthy, over 300 being sold last year. The total investment in the retail end amounts to about $42,000.

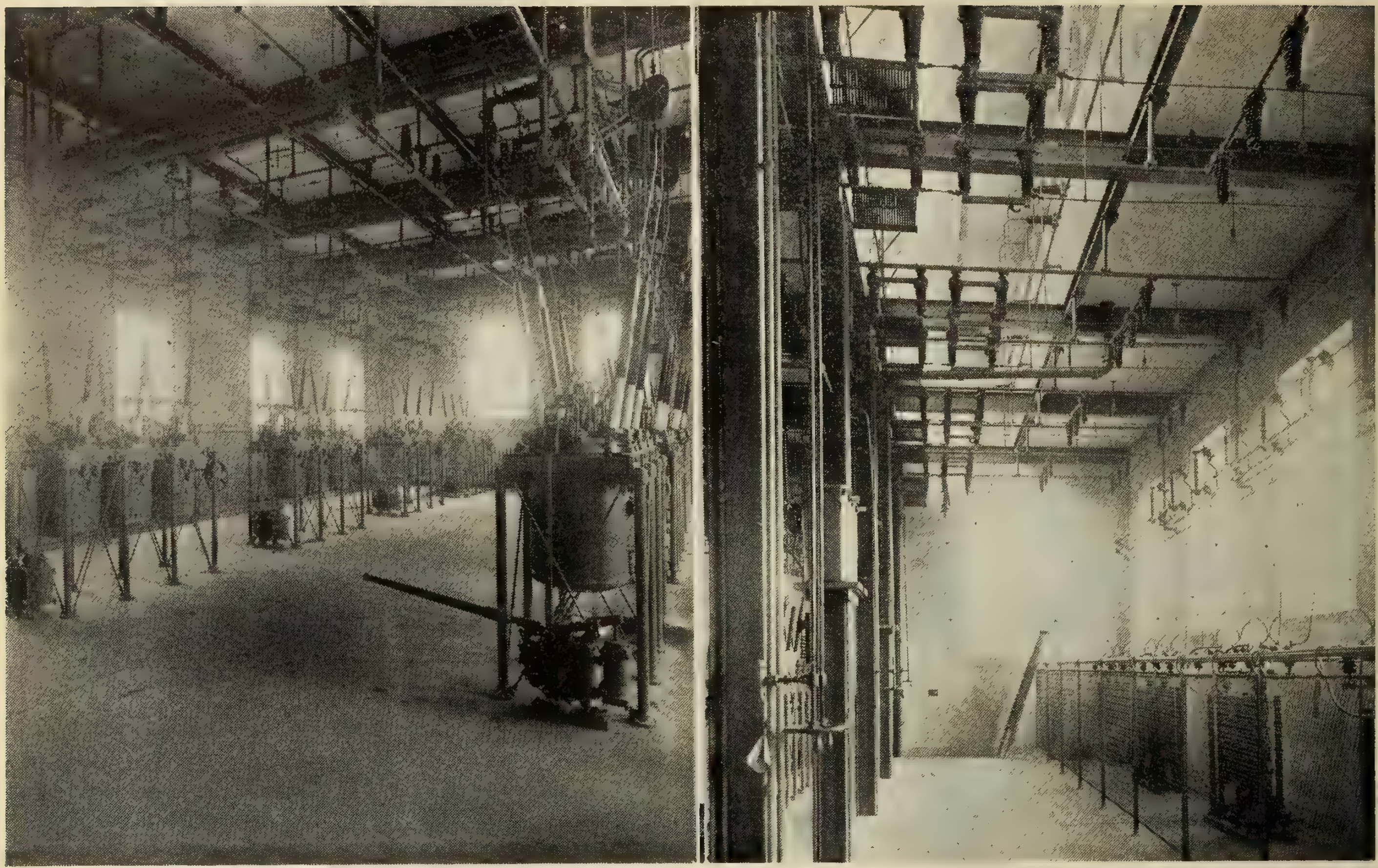
The Second Floor

On the second floor are the offices of the manager, the assistant manager, and the Board room. The finish on this floor follows the same general scheme used on the ground floor. The third floor is left unfinished, and is used for storage of electrical appliances and wiring equipment.

The Sub-station

The main sub-station is incorporated in the building and is entered from Wellington Street. Power is received at 13,200 volts from two three phase transmission lines which enter from the roof. Two 13,200 volt, three phase lines from this station feed other local sub-stations. While the present

Right—A view of the Galt Hydro building that indicates its substantial character. Left—The main switchboard; 31 marble panels



Left—High tension oil breakers, bus bars and current transformers. Right—Incoming 13,200 volt lines and arresters

high tension voltage is only 13,200, it is anticipated that at some future date this will be increased to 26,400 volts and accordingly all high tension equipment has been designed for use at the latter potential.

Four three phase transformer banks are installed, three of which have 2,200 volt secondaries, the fourth being 550 volt secondary.

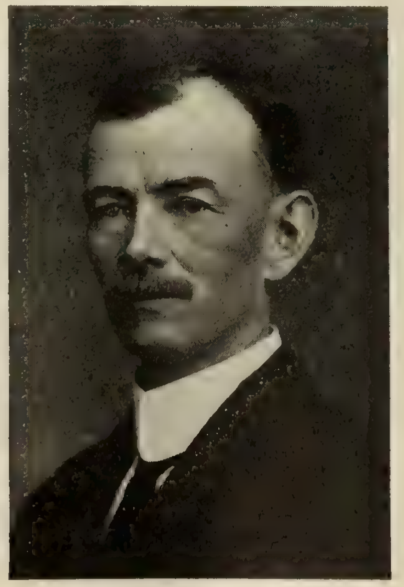
In-coming Lines

The in-coming 13,200 volt lines, arresters, disconnecting switches and choke coils are shown in one of the figures and another photo shows the high tension oil circuit breakers and bus bars, current transformers, disconnecting switches etc. The arrangement adopted, of suspending all pipe structure from the roof steel and bracing to column, has resulted in a very clean cut layout.

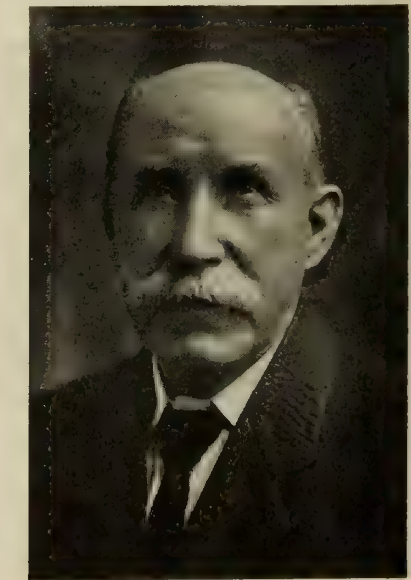
Emergency 2,200 and 550 volt buses are installed and all feeders are equipped with double-throw disconnecting switches so that in the event of trouble on the main bus or circuit breakers, the feeders can be thrown directly onto the emergency bus.

All circuit breakers are electrically operated from the main switchboard which is located on the ground floor. The

A. B. Scott, Secretary-Treasurer
Public Utilities Commission



W. H. Fairchild, Manager
Public Utilities Commission



Robert Elliott, Assistant Manager
Public Utilities Commission

switchboard consists of 31 panels of polished blue vermont marble and is 36 feet in length.

The installation is very complete in every respect and reflects great credit on the engineers of the Galt Public Utilities Commission.

The entire switching equipment with the exception of the lightning arresters was furnished by the Canadian Westinghouse Company. The arresters were provided by the Canadian General Electric Company.

Work Done in Galt

The complete building as it stands cost $160,000 while the electrical equipment entailed an expenditure of $60,000 making the total cost $220,000. The work of removing the buildings that previously occupied the site commenced in April 1921, and the building was occupied on July 3rd last. Manager W. H. Fairchild was in sole charge of construction and all materials, in-so-far as possible, were "Made in Canada." The electrical arrangements were worked out under the superintendance of assistant manager Robert Elliott, to whom a large share of the credit is due. Ample provision has been made for the installation of additional equipment as the future growth of the load in Galt may warrant.

The executive staff who were responsible for the work consisted of Messrs. W. H. Fairchild, manager; Robert Elliott, assistant manager and A. B. Scott, secretary-treasurer. Galt Public Utilities Commission is composed of Messrs. G. Turnbull, chairman; R. B. McGregor, G. Hancock, Jr., A. W. Mercer and Dr. S. E. Charlton, mayor of the city.

Power Plant at Thessalon

Contracts have just been awarded for the construction of a small power plant at Thessalon, to be known as the Thessalon Power Development. The complete work calls for a concrete dam, 390 feet of 48 inch wood stave pipe line, and a concrete power house. The equipment will be operated under a head of 40 feet. The capacity of the plant will be in the neighborhood of 200 h.p. The dam is being constructed by Messrs MacNamara at a cost of $15,300. The turbine, generator and direct-connected exciter will be installed by the William Kennedy & Sons, Owen Sound, Ont., at a cost of $9,200. James, Proctor and Redfern Ltd., are the engineers.

Appliance Show Room of Galt Hydro building—Windows are of generous size and illumination thus provided is supplemented with 18 Duplexalite units—Each appliance is given plenty of space for display purposes—the sale of over 300 ranges in one year testifies to the soundness of the merchandising policies followed.

Province Loses Valued Commissioner

Mr. Fredrick R. Miller, prominent engineer and contractor of Toronto, died at the Victoria Memorial Hospital in that city a few days ago. Mr. Miller had been ill since June, having undergone two operations in that time for stomach ailments. He was born in 1878 in St. Catharines, Ont., and passed his early life in Ingersoll, Ont., being educated there at the public and high schools, prior to coming to Toronto University, from which he graduated in engineering. He served from 1902 to 1909 with the firm of Haney and Miller, leaving them to become manager of the Port Credit Brick Company. In 1910 he joined his father's firm, Roger Miller & Sons, as a partner, and became vice president in 1917. Other of his business affiliations were his position as president of Owens and Elmes, Limited, and his position as vice-president of Claburn and Company, Limited, of Vancouver, fire brick manufacturers. Many of the engineering works in Toronto are testimonies to his skill in his profession. He executed many of the Harbor Commission contracts, built the new intake pipe and also erected the sea wall. He first notably entered public life during the period of the war when in 1916, he took charge in the Toronto district of the production of munitions for the Imperial Munitions Board. So successfully did he function in this capacity that his jurisdiction was increased to include the whole province. Later he was appointed by the Imperial Munitions Board to become vice-president and general manager of the British Forgings Company, Limited. In all these positions he served the Government entirely without recompense. He was a member of the Hydro-electric Power Commission of Ontario and of the Toronto Transportation Commission, having supervised the extensive program of rehabilitation work carried out by the latter body last year. He was an ardent enthusiast for motor boating, motoring and golf and was the owner of the motor boatsHeldena I., Heldena II., and Heldena III., the latter winning the International Gold Cup Trophy at the Exhibition races last year. He was a member of the R.C.Y.C., honorary commodore Parkdale Canoe Club, past commodore Toronto Motorboat Club, and member of the Eglinton Hunt, Engineers, Mississauga Golf, Ontario, Albany and Old Colony Clubs, and of the Rideau Club, Ottawa. He had served on the executive of the American Power Board Association.

Toronto Transportation Commission New Cars of Improved Design

Aside from the heavy work undertaken in the improvement of the road-bed, and the purchase of 250 new cars some months ago, the Toronto Transportation Commision is further improving and speeding up the service by the addition of more motor cars and trailers. 200 new cars have recently been ordered, 100 of which are motor cars and 100 trailers.

Particular interest attaches to the design of the new trailers. Those already in service are of the centre entrance and exit type, single doors being operated by a short space, which is occupied by the conductor's stand. When these trailers are used with motor cars having double door entrance and exit, there is a tendency to delay, owing to the narrower doors in the trailers, because the capacity of the motor cars and the trailers is practically the same. The single door arrangement also seems to tend to cause passengers to instinctively avoid the trailer, on the supposition, presumably, that there will be more delay in boarding or alighting.

In the new trailers this difficutly has been overcome, by a door arrangement worked out by the assistant general manager of the Toronto Transportation Commission, Mr. D. W. Harvey. By the addition of a third door at the centre and a flexible arrangement by which the third door may be used either for entrance or exit, depending on traffic requirements at the moment, the time of loading and unloading will be speeded up and made comparable with that of the double door entrance and exit motor cars. The features of the new trailers are explained below in somewhat more detail.

Three Door Feature

The new trailer differs from those now in service in that it has three doors instead of two now used, the odd door being in the centre. The door on the extreme left, entering, is always an exit door, that on the extreme right always an entrance door, but the centre door may be used either as an exit or an entrance, though not both at the same time.

Inside the centre door is a movable barrier, see figure. When the conductor wishes to use the door as an exit, the barrier is swung at right angles to the centre of the car. The passengers in the forward part of the trailer can then file past the conductor, pay their fares and secure transfers as they leave, without interfering with the unloading of passengers in the rear of the car, who have previously filed past the conductor on their way to the rear seats and paid their fares. When the barrier is swung back along the centre line of the trailer, the door becomes an entrance to load the car.

Adapted to Heavy Traffic

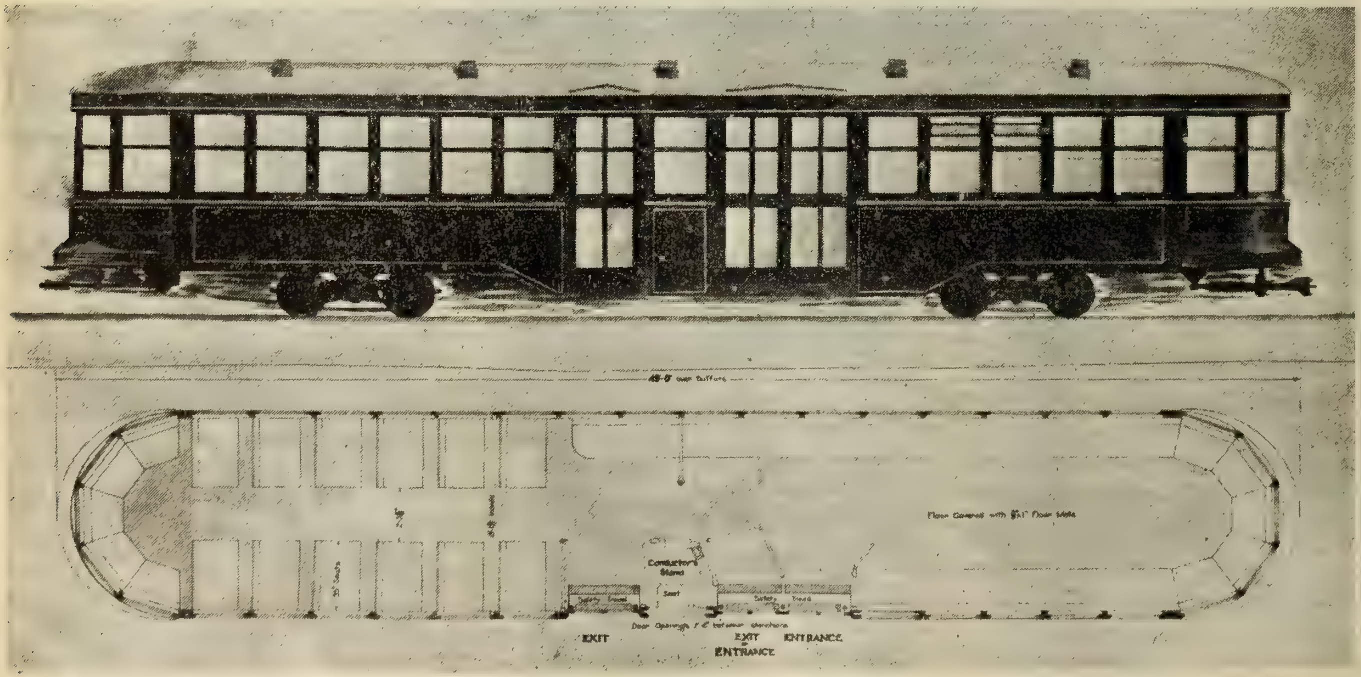
Explaining the design of the car Mr. Harvey said it was adapted to heavy traffic routes. When it was travelling in an area in which the great majority of the passengers wished to board, the centre door would be used as another entrance; when the trailer was coming into the area at which the passengers wanted to alight, and conditions were reversed, the conductor would swing the barrier and use the door as an exit. This made the cars more flexible and would greatly speed up the handling of the rush-hour traffic.

Delivery Starts in November

The Canadian Car and Foundry Company, of Montreal, is building the 100 trailers, and the first ones will be delivered in November. This company is also building 50 of the motor cars, and the Ottawa Car Company will build the other 50. These cars will be delivered approximately the same time as the trailers.

New Motor Cars

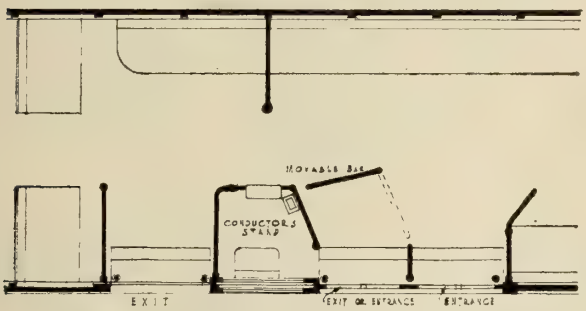
The new cars are of the Peter Witt type, but have some special features. They are one window length shorter in both the front and rear ends, being 47 feet long as com-



Trailer Equipped with Harvey Patent Feature pared with the 52 feet of the earlier cars. They are equipped with four 35 h.p. motors and are not designed to haul a trailer; it is the intention of the commission to use these cars on lines of medium or light traffic.

One Man Can Operate

Another feature of these new motor cars is that they can be operated either as one or two man cars. The front vestibule is divided by a curved barrier, so that the cars can be converted into one-man "pay-as-you-enter" or one-man "pay-as-you-leave" cars. Normally, of course, the conductor is located in the centre of the car. Each car is capable of accommodating 60 people sitting.



Plan showing Harvey Feature

We understand the commission is not planning the operation of one-man cars at the present time, but, if the necessity for such cars should arise in future, the new motor cars will serve the purpose without added expense.

The entire electrical equipment for the new motor cars as well as the brake equipment for both motors and trailers is being supplied by the Canadian Westinghouse Company.

Winnipeg Grand-Beach Line

Electrification of the Canadian National Winnipeg-Grand Beach line, a distance of approximately seventy miles, is being considered, according to recent reports. Negotiations are under way with the Manitoba Power Company and it is hoped to obtain a low rate for electrical power with a view to establishing the fact that electrification of railways on the Prairies would be feasible and economical.

It is said that Winnipeg's hydro-electric stand-by plant will, in all probability. be located on the site immediately east of Victoria park, and between that park and the river. The civic public utilities committee named a committee of three to investigate the possibilities of the site after considering a report from the city surveyor. The sub-committee will inspect the site and report back to the parent committee with a view to making a definite recommendation to council.

Trade Publications

"Arc Welding in Electric Railway Shops" is the subject of a publication just issued by the Westinghouse Electric & Manufacturing Company, East Pittsburg, Pa. The publication, which is known as Leaflet No. 1824, describes the many advantages of arc welding and gives figures showing the great saving possible by reclaiming worn out parts.

A new illustrated publication, Reprint 118, has just been issued by the Westinghouse Electric & Manufacturing Company, embracing an article by Professor Chas. F. Scott on the subject "The Question of Inductive Interference and Electrolysis as Related to Railroad Electrification."

Montreal Harbor Railway to be Electrified

Electrification of the harbor railway terminals, at present steam-operated and consisting of surface lines with a total trackage of 58 miles situated between the Victoria Bridge and the Imperial Oil wharf, will be completed by the end of September to the extent of about 42 miles of track from Victoria pier east, and the electrical operation of this section will then be inaugurated. The remainder, about 16 miles of track from section 19 westward, will not be electrified until later, according to a statement by M. P. Fennell, general manager of the port. As soon as the first part of the electrification process is completed two electric locomotives will be placed in service, and by degrees the whole of the ten steam locomotives owned by the Harbor Commission will into service will be leased for the purpose from the Canadian be replaced by electrics. The first two of the latter put into service will be leased for the purpose from the Canadian National Railways, but others of a more powerful type and suitable for the heavy work in the harbor terminals will be constructed specially for the commissioners. As the system develops additional electric locomotives will be added as occasion demands. Specifications for the first of the new locomotives are being prepared by T. E. Salter, electrical engineer in charge of the system, but will not be completed until tests have been made with the locomotives leased from the Canadian National Railways.

Advocated by W. G. Ross

Electrification of the harbor terminals was advocated for many years by W. G. Ross, former chairman of the Harbor Commission, and it is largely due to his efforts and progressive policy that this undertaking is now successfully nearing consummation. Early in 1918 the then commissioners realized that traffic on the railway terminals was increasing so rapidly that to avoid congestion it was necessary to procure more steam locomotives or to electrify the system. With the latter idea in view, a number of important electrified freight terminals were visited and conditions closely studied, with a view to obtaining the best possible system for the Montreal harbor terminals.

Electrification Economical

It was found that electrification for freight yards and terminals was everywhere reported upon as being very economical and satisfactory, electric locomotives being considerably more efficient than steam. This is especially true in the winter time. An electric locomotive is also capable of drawing heavier loads up steeper grades, if necessary, than one operated by steam, the former having the whole capacity of the power house behind it, while the latter's power is limited to the extent of its power capacity. The elimination of the smoke and soot evil and the saving of coal were also important items to be considered.

2,400 Volt d.c. System

In view of the climatic conditions and the highly successful operation of the Canadian National Railway lines through the Mount Royal Tunnel terminals, which have a 2,400 volt direct current overhead system in use, it was decided to adopt a similar system for the Montreal harbor terminals. Work on the electrification commenced on September 22, 1919, and continued until August, 1921, when it was suspended for almost a year owing to lack of the necessary funds. It is now being rapidly pushed to completion.

Correction

In our issue of September 1st, under the heading "Diesel Plant at Ft. Saskatchewan" it was stated that the Provincial Government of Saskatchewan would install an electric plant operated by Diesel engine at the Provincial Jail in Fort Saskatchewan. This should have read the Provincial Government of Alberta.

Definitions and Tests for Electrical Insulating Papers

The Findings of a Special Committee of the Electrical Research Association of England—Basis for Acceptance Tests

In view of the fact that up to the present, in Canada, there have been no universally accepted tests or definitions relating to electrical insulating papers, the findings of a committee which has made a special study of these materials, will be received with interest.

The work has been carried out by the Electrical Research Association of England, and is a continuance of studies initiated by its predecessor, the Electrical Research Committee.

Those papers which are employed in the construction of cables were not studied. Extensive research on other varieties, however, was carried out, and finally, after collaboration with the manufacturers, a series of definitions and tests was laid down. It is believed that these are conservative and inclusive and will serve as a basis for the development of acceptance tests.

Definitions

Pure Manilla Fibre Paper.—Paper made from Manilla fibre only. The best is made from new fibre.

Manilla Paper.—A strong paper made from sulphite wood pulp. May contain some Manilla and hemp fibre.

Rope Paper.—Paper made from rope-ends.

Sulphate, Sulphite and Soda Wood Papers.— Papers made from wood pulp only by the sulphate, sulphite and caustic soda processes respectively. Known collectively as chemical wood pulp papers.

Mechanical Wood Pulp Paper.—Paper made from wood

Jute Paper (Horn Fibre Paper).—Paper made from jute

Jute Paper (Horn Fibre Paper).—Paper made from jute fibre only without the use of chemicals.

Soda Rag-pulp Paper.—Paper made from rags only by the caustic soda process.

Lime Rag-Pulp Paper.—Paper made from rags only by the lime and carbonate of soda process.

Rag Bond and Rag Bank Paper.—Paper made from linen and cotton rags only and weighing not more than 13 lbs. per ream (480 sheets), post size (21 in. by 16½ in.).

Leather Paper (Fish Paper).—Paper made from cotton rags only and afterwards chemically treated (generally with zinc chloride) to produce a homogeneous sheet of celluvert.

Tissue Papers.—Papers of which the weight of 2,000 sq. ft. does not exceed 9 lb.:

Best Rag Tissue (Condenser or Electrical Tissue).—Made from rags only. The heavier grades are known as electrical tissue.

Cotton Tissue.—Made from cotton rags only.

Silversmiths' Tissue.—Made from rags only, grass bleached, and free from chemicals and loading materials.

Sulphite Tissue.—Made from wood-pulp by the sulphite process. May contain rag pulp.

Sulphate Imitation Japanese Tissue.—Soft porous tissue paper made from wood-pulp by the sulphite process.

Japanese Tissue.—Tissue paper made in four grades known as Gampi, Kodzu, Tosa Dental, Mino Dental differing in quality according to fibre, method and locality of manufacture.

Tests Recommended

The tests recommended for the study of electrical insulating papers are as follows:—

Clause No.	Contents
1.	Conditioning.
2.	Thickness.
3.	Density.
4.	Tensile Strength and Elongation.
5.	Ageing. (Bursting Test.)
6.	Tearing.
7.	Porosity.
8.	Chemical.
9 and 10 .	Metallic particles, etc.
11.	Crinkling.
12.	Microscopic.

Conditioning.—(To precede all tests under 4, 6, 7 and 8). Single sheets shall be kept in a controlled atmosphere at 75 per cent. relative humidity and 70 deg. F. for not less than eighteen hours, the correct humidity being obtained by the use of dilute sulphuric acid (sp. gr. 1.220), and tested immediately afterwards.

Thickness.—Ten measurements shall be taken equally spaced diagonally across a sample one foot long and the full width of the roll of paper, by means of a micrometer fitted with a ratchet head and measuring faces between ¼ in. and ½ in. diameter one of which shall be free to swivel. The maximum, minimum, and mean values shall be stated.

Density.—The density in grammes per cub. cm. shall be taken on samples not more that 8 in. square after 3 hours heating at 212 deg. F.

Tensile Strength and Elongation.—Twelve samples ⅝ in. by 10 in., six in the direction of the paper and six across, shall have a load gradually applied to determine the tensile strength in lbs. per square inch sectional area and the percentage extension on the original length under load.

Ageing. (Bursting Test.)—Tendency to age shall be tested comparing the bursting strength of samples before and after heating to 230 deg. F. for 24 hours. Samples shall be selected as for the thickness test and treated as follows:—

The paper shall be gripped on to a ring leaving a free circular membrane which shall be subjected to fluid pressure until it is broken. The value of the pressure required to break the paper, shown on an indicator attached to the apparatus shall be expressed in lbs. per square inch, which value is defined as the bursting strength of the paper. Maximum, minimum and mean values shall be stated.

Tearing Strength.—To determine the tearing strength, a sample sheet 6 in. square is clamped in a sliding wooden frame which can be drawn along between guides by means of a simple winding gear. A 3/32 in. hole is punched in the centre of the sample and the strip on one side of the hole cut through and turned back into a clip attached to a spring balance. Rotating the winding gear draws the main portion of the sheet along and the strip attached to the spring balance tears away while the balance registers the force required. Maximum, minimum and mean values both for "length" and "width" shall be stated.

Porosity.—For this test the sample is clamped between two metal discs with recesses 1 in. diameter on the faces next to the paper. The upper recess is open to the air and the lower one connected to the upper end of an inverted 100 cub. cm. glass burette supported in a retort stand. By means of an aspirator bottle which is connected through a rubber tube to the lower end of the burette, the water level in the latter is raised to the zero mark near the paper clamp, and the stop cock closed. The aspirator is then lowered to a second fixed position so that the water level is 24 in. below the burette zero, and the stop cock opened for fifteen minutes. Air is thus drawn through the paper sample and the fall of level in the burette, in cub. cm., is a measure of the porosity of the sample.

Chemical Tests

Moisture Loss on Drying at 212 Deg. F.—A sample weighed after conditioning is dried at 212 deg. F. for 3 hours and re-weighed. The moisture loss shall be computed as a percentage of the conditioned weight before drying.

Test for Acidity and Alkalinity.—Weigh off duplicate 200 c.c. distilled water to each. Boil for 20 minutes, wash lots of 10 grammes each into quarter-litre flasks and add with warm water and test with methyl orange.

If alkaline, titrate with standard centinormal sulphate acid.

If acid, titrate with standard centinormal sodium hydrate or potassium hydrate.

In each case the number of c.c. of the regent required to neutralize the paper shall be stated.

Mineral Ash.—Completely ignite a dry sample from test 8 (a) with all precautions against loss. The amount of the incombustible matter shall be computed as a percentage of the dried sample.

Sizing Tests.—The total resins in the size shall be determined on five gramme samples of paper by extraction with acidulated alcohol, and the nitrogenous material on gram. samples by the Kjeldahl-Gunning† method.

Chemical Tests for Metallic Particles.—The paper is immersed in a potassium ferrocyanide solution after saturation in dilute hydrochloric acid when each iron particle will produce a blue spot on the paper.

The application of a 1 per cent. solution of silver nitrate to the surface of the paper will produce a black spot on each metallic particle.

The paper is dropped into a 1 per cent. solution of acetic acid and allowed to air dry for one hour lying flat on a cloth. The sample is then dropped into a solution containing 0.1 cub. cm. acetic acid and 0.1 gm. of potassium ferrocyanide in 100 cub. cm. distilled water. The iron particles will appear as blue spots and the copper, brass and gunmetal as red spots. The number of particles per square foot to be stated.

Flash Test for Conducting Particles.—The paper is drawn at a speed of 2 ft. per min. between a metallic plate and brass rollers 3 in. long and ⅞ in. diameter each exerting a pressure of about 10 oz. on the paper under test. An alternating potentian difference of 50 V (50 cycles)* per mil thickness of paper is applied between the roller and plate and the number of punctures per square foot noted.

Crinkling Under Tension.—This is sometimes an important factor but further information is required before this clause can be drafted.

Microscopical Examination.—This test is for the purpose of identifying the constituent fibres of the paper.

Ten specimens each the size of a sixpence from widely distributed positions in the samples are torn up and boiled for a few minutes with about 20 cub.cm. of 0.5 per cent. solution of caustic soda. After draining and repeated washings in tap water the paper is then washed with about 20 cub. cm. of 0.5 per cent. solution of hydrochloric acid and again washed with tap water. A "pill" of the paper is made up and shaken in a test tube half filled with water until it disintegrates into fibres. A small quantity is then removed to a glass slide and after partial drying with filter paper two or three drops of zinc-chloride-iodine stain are placed on the fibres teased out with steel needles.

Composition and Preparation of Zinc-Chloride Iodine Stain

25 cub. cm. saturated zinc-chloride solution at 70 deg. Fahr.
5.25 gm. potassium iodine.
0.25 gm. iodine.
12.50 gm. distilled water.

The last three ingredients are mixed together, the zinc chloride added, and after settling overnight the supernatant liquid decanted off. The stain must be kept away from light and air.

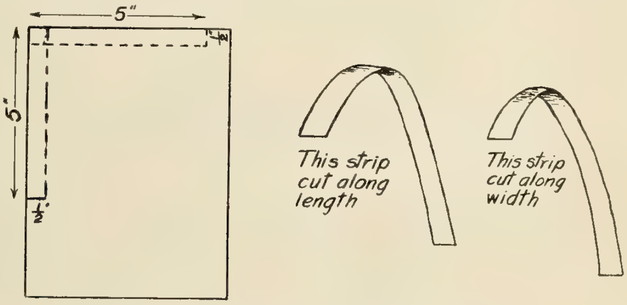
Under the microscope, using this stain and a magnification of 50 diameters. the fibres appear colored as follows:—

Cotton and linen rags Cooked and bleached Manilla	Wine red.
Cooked and bleached wood-pulp Cooked and bleached straw and esparto	Blue to blue violet.
Mechanical or ground wood pulp Jute, uncooked, and Manilla Highly lignified fibres	Yellow to lemon yellow.

The shapes and markings of the fibres as well as the colors should be considered in the estimation, and care should be taken to have apparatus and fingers free from fibres before beginning the preparation of a sample.

Appendix

Determination of "breadth" and "length" of paper.—Two strips ½ in. width by 5 in. long are cut at right angles to one another from the sample submitted. By holding them vertically between the thumb and finger so that they fall over it will be found that the one which appears to be more rigid, i.e., stands the higher is the one cut along the "length" of the paper.. The other is cut along the "width."



Determination of length and width of paper

Schedule Indicating Uses of Paper

Uses	Papers in General Use
1. Paper used as Insulation.	Chemical wood pulp.
Manufacture of Tubes and Sheets.	Chemical wood pulp, Manilla, Jute, Rag Bond, Best Rag Tissue.
Between layers of windings and similar purposes.	Chemical wood pulp, Manilla, Jute.
Insulating wrappings.	Chemical wood pulp.
Between punchings.	Mechanical wood pulp.
Condensers.	Condenser or Electrical Tissue.
2. Papers used as Insulation and as Mechanical Protectors.	
Slot Insulation.	Manilla (Red), Red Rope, Jute, Leather.
Wrapping Core Bolts.	Manilla (Red), Red Rope, Jute, Leather.
Bobbin flanges and other parts where high insulation is not required.	Manilla (Red), Red Rope, Jute, Leather.
3. Paper used as a mechanical support in building up Insulating Materials.	
Backing up mica folium mica tape or micanite.	Chemical wood pulp,, Manilla, Japanese Kodzu or Dental Tissue, Sulphite Imitation Japanese Tissue.
Covering for micanite	Sulphite Tissue.

Electricity at the Big National Fair

Can You Imagine the Canadian National Exhibition with Electricity Removed?—It is the Heart and Nerve Centre of all the Activities

One's general impression of this year's electrical show is that the exhibits were more numerous. Several new concerns were represented, and more lines were shown by some of the older firms. An improvement in the dressing of the booths was an encouraging sign. There were very few cases of poorly dressed booths; in fact, most exhibitors seemed to regard their stands as an artist does a picture, and put forth every effort to secure attractive displays.

The large number of electric washing machines was a feature of the show. It would be impossible to say who had the best exhibit, but it is safe to say that the general public could scarcely fail to get some grasp of the fact that to wash electrically is the best way.

A greater tendency to meet the farmer's needs was evinced. Several types of farm lighting and power plants were exhibited, and it was noteworthy that these seem to be made with as little mechanism as possible; low voltage appliances were also featured. The signs point to a great growth of the isolated plant business in the future.

The scattered arrangement of the various electrical displays is unfortunate for the industry. It makes it almost impossible for the public to get a comprehensive grasp of its scope.

We are printing below a few words about each of the exhibits, and regret that their large number makes longer descriptions impossible:

Balmer and Blakely—The booth maintained by this company in the Electrical Building contained some very artistic work. Carver's models and memorials were shown and also some very fine examples of indirect and semi-direct lighting fixtures.

Beatty Bros., Ltd.—Housewives gathered around the Whitecap washer and seemed delighted with the demonstration. Some real washing was done and the salesman in charge was kept busy explaining the operation of the machine.

Bell Telephone Company—A complete switchboard, where the manner of operation was demonstrated, and several booths made an interesting display.

Blue Bird Washer—A machine partly assembled showed the interesting construction of the Blue Bird, and divided attention with one shown in actual operation.

Chas. A. Branston Co.—"There's Music in the Air" was the title affixed to a painted landscape, portraying the broadcasting and reception of music, which formed the back-ground of this company's booth in the Electrical Building. Various types of radio and vibrator sets were displayed. Another booth was maintained by this company, in which the Branston generator was brought more to the front.

Brantford Washing Machine Co.—The distinctive features of the Locomotive washer were well displayed, and an active demonstration was carried on. A glass panel demonstrating machine was used.

William Campbell Sales Co.—The Automatic Rapid Electric Stove was demonstrated by this company. A large show card proclaimed that the stove baked, boiled, stewed, roasted, fried and toasted.

Canadian Drill & Electric Box Co.—A simple and attractive display was put on by this company, comprising three large display-boards, carrying all types of their switch boxes set at the sides and back of the booth, with a large Canadian flag draped in the centre.

Canadian Electric Floor Waxer and Polisher Co.—The fast working and versatility of this company's electric floor waxer and polisher was kept in the public eye by a continuous demonstration. Several sections of floor were shown in different stages of waxing and polishing. The convertible feature of the machine won much approval and many enquiries were received.

Canadian General Electric Company—A combination of artistic arrangement and intelligent demonstration made the booth of the Canadian General Electric Company an attraction for all. The familiar black checked bag of the Premier Vacuum Cleaner was visible in full size and in miniature, and the demonstrator was out to prove that it lived up to its name. Action was also obtained with the Eden Washer, and the great interest displayed proves the value of such a display.

At the **Hotpoint** booth, housewives seemed particularly interested in the products of the electric range, of which a tempting assortment was continually on view. A lively demonstration was furnished with a reversible electric toaster, and other appliances were displayed to their best advantage. A special feature of the exhibit was a bread baking oven, commercial type.

Another C. G. E. appliance display was included in the Stratford exhibit, and added not a little to the brightness of that section.

Canadian Independent Telephone Co.—Many inquiries re the equipment on display proved that the radio craze is not dead. Various forms of telephone apparatus also proved interesting, and the demonstrators were busy.

Canadian Link-Belt Co.—The exhibit of this company comprised a display of the various types of chain used, photographs showing various interesting applications of this form of drive, and an optical device demonstrated the action of the chain when working.

Canadian National Carbon Co.—The booth arranged by this company was equipped with a number of striking display cards, and Columbia Carbons and Eveready batteries were well demonstrated to the public. A good location, good arrangement and able demonstration were combined in this exhibit.

Canadian Wireless Telephone Co.—This display featured a small city set for short ranges. Its compactness and portability proved very interesting.

Caron Light, Water and Power Plant—Any farmer nowadays can have electric power—as was amply shown by the Caron exhibit. A handsome little isolated plant ran continuously at this company's stand and drew much attention.

Century Electric Company—Fans and motors of Century design were shown by the Jones and Moore Electric Co. Various sizes were arranged in the floor, with fans at the rear.

Clements Mfg., Co.—The Cadillac Cleaner was given a

Convention of Contractors and Dealers
in Toronto, November 13 and 14

thorough demonstration, and the exhibition of machines and parts proved attractive to many.

J. H. Connor & Son, Ltd.—This company's line of washing machines were actively demonstrated, and the contrast between the fatiguing labor necessary with the old machine, compared to the ease of the electric washer, was well brought out.

Continental Electric Co.—The suction powers of the Royal cleaner were well demanstrated by the striking stunt of picking up ten silver dollars in a row. Catchy selling phrases were painted in cards and placed around the walls of the booth.

Diamond State Fibre Company—The many uses to which fibre can be put were revealed by an assemblage of parts on a display board in the front of the booth. A large vertical showcase illustrated the whole process of manufacture, and interest in the exhibit was heightened by a showing of various fibre products. The booth was well arranged, shrubs being used to give a lighter touch.

Dominion Battery Co.—Besides their general line of dry cells and flash lights, the Dominion Battery Company featured radio batteries in their exhibit. A model aerial added an interesting touch to the display.

Dominion Engineering Agency, Ltd.—Mr. D. M. Fraser was kept busy answering enquiries. The display was interesting and included U-RE-LITE breakers of various sizes, Sundh remote control apparatus, and arrester and disconnecting switch by Schweitzer-Conrad, Robbins & Myers motors and power stand, and rawlplugs. These latter were shown used in materials of such varying composition as glass, slate and plaster.

Dominion Motor Castings—This company exhibited a novel electric washer, embodying a point of special interest to farmers, viz.—construction that enables the copper washing cylinder to be replaced by a churn.

Dowswell, Lees & Co., Ltd.—The Seafoam, New Century and others of this company's line of washing machines drew a good deal of attention. A large size wringer, for power drive, was a feature of the display.

Easy Washing Machine Company—The story of the "Easy Washer" was told by an active demonstration, in which the point of stress was the ease of operation. One machine was placed on a strikingly draped blue dais and drew much attention. A second booth was maintained by this company under the grand stand, and it also proved a centre of attraction, the good looks of the washer being a subject of frequent comment.

Electrical Systems, Ltd.—A copper tub washer, with two motors, was a feature of this display. The Keith refrigerator was also shown.

The Elliott Machinery Company—"My Laundry Maid," a nifty looking washer, was demonstrated successfully. Beltless drive and metal construction are noticeable features of the machine.

Exide Batteries of Canada—The favorable location of this company's factory, just outside the west entrance to the Exhibition induces them to forego the advantages of a booth inside the grounds, and instead to have visitors go through the factory. Mr. Wilkes states that the various processes of battery manufacture were continually demonstrated to many spectators.

Florentine Statuary Co.—From the standpoint of purity of design, and beauty of arrangement the exhibit of this concern was well to the front. Molded floor, table, and hall lamps, lamp-bearing statues, and high class fixtures were shown in pleasing variety.

Globe Engineering Co., Ltd.—The Arctic Air Refrigerator was shown in several sizes, and the demonstrator was kept busy explaining how it did away with the iceman.

Hart Battery Co.—Radio batteries were the feature in the well arranged booth of the Hart Co. In addition, batteries for every power purpose were shown. Mr. C. V. Edwards had a busy time answering enquiries.

Henry Engineering Co.—Radio batteries, Pierce fuses and refills, bell transformers, Shaydolite, Bakelite, Jewell instruments, charging transformers and many other items, made an attractive showing.

Jack Frost Refrigerator—An iceless refrigerator in operation, well-filled with perishable foods, was the feature of this display.

Hoover Suction Sweeper Company—The Hoover display featured a large map showing by means of red-headed pins the location of Hoovers in Toronto. Nineteen machines were exhibited, and one was so placed that a mirror revealed the famous Hoover action. Mr. F. J. Paxton, Toronto manager, proved an efficient demonstrator.

Hurley Machine Company—One of the few dishwashers seen at the Fair was shown in this booth. The Thor washer and ironer were also exhibited and a demonstrating machine with glass plate proved a centre of interest.

Hydro Appliance Co.—Beauty, convenience and safety are claimed for the "Miss Hydro" washer, the latest product of this firm. A special machine with glass top and side was used for demonstrating.

Hydro Booth—Somebody must have put a little real brainwork into the arrangement of the Hydro booth—the exhibit comprised ironing machines, cleaners, ranges, washers, appliances and included active demonstrations, and yet there was no discordant note. This stand was located in the Electric Building but the same might be said of the other Hydro booth, in the Industrial Building, which also displayed a great variety of electrical appliances.

Come to the Convention, Nov. 13 and 14.

Ingersoll Machine and Tool Co.—This booth was the scene of an impressive demonstration of Baby Grand Ironers in action. Nicely ironed laundry was displayed on a clothes rack, and efforts of the demonstrators were ably seconded by snappy slogans around the walls of the booth.

Jewett Radio-Phonographs—The combination of a radio set in a phonograph case, displayed by this company was interesting and attracted much attention.

Lancashire Dynamo & Motor Co.—This booth proved that motors can be shown attractively. The ball-bearing feature was stressed, and sizes up to 36 h.p. were shown. Oil and air starters were included, the latter embracing a non-arcing feature. A disassembled motor showed all the parts, and the well-known Lancashire construction of bringing the motor leads to a central point was demonstrated, the enclosed features being especially noted.

R. A. Lister & Company—A continuous demonstration was carried on of this company's isolated plant. The outfit is engine driven and is furnished with or without batteries.

A. R. Lundy—The Liberty washing machine was given a continuous demonstration, rain or shine.

Mack Storage Battery Co.—The completeness of this company's line was demonstrated by their extensive showing of batteries. A cell cut down to show its construction made an interesting item.

Marconi Wireless Telegraph Co.—Powerful and modern wireless apparatus drew the attention of the wireless fans.

Masco Co., Ltd.—Mr. G. W. Patterson had a lively time demonstrating the features of the A B C washers, running a guessing contest, and generally superintending the booth. The display was very artistically arranged. Enquiries were plentiful.

Maytag Co.—"A Tempest in a Tub" is a phrase used by this company to describe their electric washer, and their exhibit was designed to bear out its truth. One washer was placed in an elevated position, with an inclined mirror over it, and its strong action was thus very well indicated.

Maxwells, Ltd.—The products of this company were exhibited in several booths, and the powerful action of the Mono-Vac washer attracted much attention. A glass-sided tub was used for demonstration purposes.

Edison Mazda Lamps—These were shown in a separate booth, which contained a showcase, and wall-case, with the different varieties. The arrangement, in which ferns were used, was simple and effective.

McClary Mfg., Co.—Electric ranges, hot plates, irons and water heaters formed the basis of this company's display. The range exhibit was particularly striking, every type of the company's manufacture being used. The slogans "Protected Element" and "Seamless Oven" were particularly noticeable.

McDonald and Willson Co.—The booth of the McDonald and Willson Co., in the Industrial Building was remarkable for the pleasing display of fixtures, and the well planned lighting arrangements. Appliances were also exhibited in this booth and among those shown may be mentioned the Trojan washer, Clark Jewel range, Apex cleaner and an electric ironer. Their other booth, in the Electrical Building, was also well fitted with appliances.

John Millen & Son—This exhibit included a display of radio equipment and parts. Station CHFC was shown complete.

Moffatt's Limited—Thirteen types of electric ranges were shown by this company, including heavy duty hotel range and pancake cooker.

D. Moore Company—This exhibit comprised electric ranges, grates and hot plates which were well arranged and demonstrated.

National Electric Heating Co.—An extensive and well arranged display of electric heating appliances drew a great deal of attention. The lines shown included ranges of various types, portable heaters, electric grates and logs. The slogan "Convenience and Economy" was prominently displayed. A housewife was heard to remark that a National Electric range looked to be the last word in cooking devices.

Northern Aluminum Co.—An extensive and well laid out display of utensils in the Industrial Building proved that the domestic uses of aluminum are almost as important as its engineering applications. A large booth maintained by this company was completely filled with an extensive showing of its latest productions.

Northern Electric Company—The Thermo-electric water heater was given a prominent place, and its appearance and performance attracted attention. Radio apparatus, telephone systems, and a small, complete switchboard combined to make up the rest of this display, which proved interesting both to electrical men and laymen. The radio apparatus was well to the front and its arrangement deservedly attracted a crowd. Another display consisted of a receiving set installed on a C.N.R. show train.

H. W. Petrie, Ltd.—Garage and repair machinery was featured by this company, their display including cylinder grinder, drill press, miller and shaper.

Macaulay Pope—An exhibit of historical interest was included in this display, comprising a case of various types of cable which was first shown at the International Exhibition of 1851. The case contained gold medals and other awards, and a piece of gold plated cable from King Edward's yacht, in addition to the lines then manufactured by the Wilkins Co. Present day cables by the same company were also shown in an attractive way.

Prest-O-Lite Co.—A motor-generator set in operation charging farm lighting batteries was an interesting part of this display. A radio set, batteries and their parts were included in the exhibit.

Radio Equipment and Supplies—An indoor aerial and a variety of other appartus drew the fans to this display.

Renfrew Electric Products—A pretty booth and an abundant display of heaters, irons, toasters, grills, percolators, etc., constituted this display. The water pan humidifier was especially advertised.

P. L. Robertson Mfg. Co.—The well-known line of screws manufactured by this company was shown to advantage in a booth located in Machinery Hall. A board was shown in the front of the booth with scores of screws driven in, to show the ease of driving. A manufacturers' electric driver was displayed as a feature, and special brace and spiral drivers for this type of screw were also shown. Other items of this company's line, copper, brass and iron rivets, nails, bolts, wire bale ties, stove pipe wire, drive screws and cut and straight rods, were included in the exhibit.

Salisbury Electric Co.—Farmers are always present at the exhibition in great numbers, and it seemed that a good part of them stopped to look at the Kohler Automatic Power and Light Plant. Its steady running and easy starting made a great appeal.

The Salisbury Co. also made a fine display of radio equipment in the Sportsman's Building. An indoor aerial was used, and a complete set shown.

Slade Manufacturing Company—Elimination of water lifting and wringing was demonstrated again and again by the "Klymax" washer, and the spectators seemed to be impressed. The gas-heating and varying stroke features also seemed to draw attention and the demonstrator was a busy man.

Solex Co.—Two large panorama pictures, portraying buildings whose windows were lighted from behind together with a list of prominent users of these lamps, formed the essentials of this display.

Square D. Switch Co.—Square D. safety switches were shown in great variety. The sides, walls and counter in front of the booth were covered with the different types, and the demonstrator stated that there were over 300 switches in display. Special attention was given to an exhibit of a safety switch-board, of their latest type, combining dead front and rear.

Stromberg-Carlson Telephone Co.—A switch-board and various types of telephone apparatus were exhibited in a well-arranged booth.

United Electric Co.—The Ohio Cleaner and the Coffield washer were nicely arranged and were demonstrated in an effective way. These appliances were shown in two booths, one in the Electrical Building, and the other under the grand stand.

Westinghouse Electric & Mfg. Co.—The Sportsmen's Building housed an attractive exhibit by the Westinghouse Company. A workmanlike radio set was exhibited and various parts of wireless equipment. Fans were arranged in various sizes, and a novel pedestal fixture held various types of lamps.

Wagner Electric & Mfg., Co.—A typical application of Wagner motors was shown in the Westco section, where they were attached to various types of pumps. The sturdiness of the motor was emphasized.

A. H. Winter-Joyner, Limited—An attractive line of recording and indicating instruments were displayed in this company's booth. The apparatus was displayed on a table, and on three vertical panels. Weston and Bristol instruments were shown, and in addition street lighting and bus-structure equipment. A demonstration was given with a phonograph and Bristol audiophone.

Illuminating Engineering Progress

Summary of a Number of Papers that Deal With Timely Subjects in Lighting Field

The members of the Illuminating Engineering Society meet in Convention at Swampscott, Mass., on Sept. 25-28. Some of the papers to be presented are of a most interesting character. The following advance information is of timely interest.

Influence of Daylight Illumination Intensity on Energy Used for Lighting Purposes in the District of Columbia

This is a paper by A. Smirnoff, of the Engineering Department, Potomac Electric Power Co. The large central station has always had a problem which has been difficult and expensive to solve. Throughout the day it experiences a certain normal, constant load. With the sudden darkening due to clouds or the approach of a shower, a heavy load is at once thrown on the system, causing an entirely unexpected peak. To take care of these emergencies, expensive storage batteries or additional generators are frequently maintained. The investment in this apparatus could be minimized if a means of predicting the action of the weather were available. Mr. Smirnoff has determined, as a result of investigations, that there is a light intensity which he calls the "psychological darkness" at which the customers begin to turn on the lamps at a surprisingly rapid rate. This is at approximately 1,500 foot-candles in the open air. He has kept a record of many different days, typically clear, typically cloudy, variable and the like, and by means of charts shows that as the intensity drops below this figure a sudden rise in energy consumption takes place. By use of automatic devices located at what might be termed strategic points in the surrounding country it is possible to record the change in intensity of light and thus warn the operator of the expected load. It is also possible to predict with a fair degree of accuracy the intensity which will prevail at a given place and a given day, hour by hour.

The Cost of Daylight

Messrs. M. Luckiesh and L. L. Holliday, Laboratory of Applied Science, National Lamp Works, Cleveland, Ohio, have a joint paper on this subject. At first thought we all believe daylight to be a free gift of Nature. It is, under certain conditions. The study of the economics of building construction, however, indicates that under many conditions it is not as we imagined—free. Windows are more expensive to build than the same amount of wall space; the heat radiating through a window is far greater than through the wall; these are both arguments why windows should be small. In congested areas and large buildings, the expense of erecting and maintaining light courts is considerable in addition to the overhead on the valuable ground acquired for these. Under many conditions, a given area could be lighted to an adequate intensity with artificial illumination continuously at a lower cost than that necessary to provide daylight. The authors, in the attempt to point out the economics of the situation, have considered a number of typical cases and have indicated the method of procedure when making determinations of this character. Building managers, architects and designing engineers should be interested in this paper.

Lighting of Public Eating Places Offers Great Opportunities

J. L. Stair, Chief Engineer, National X-Ray Reflector Co.

Practically no field of lighting offers as many opportunities for originality and special effects as the restaurant. Proper lighting is a big factor in the comfort with which one dines and should be given primary consideration by the management. A survey of the field indicates many types of eating places, varying from the commercial or industrial cafeteria to the elaborately decorative cafe such as found on the Great White Way. The demands for lighting are quite varied.

The author of this paper has skillfully handled the subject illustrating a large number of installations which have proven successful in service from the standpoint of comfort and originality. This paper can virtually be taken as a textbook on the class of lighting which it discusses and used as a guide by the designing engineer or solicitor on which to plan future installatons.

In the first group utility must be given primary consideration; neatness must be combined with efficiency. In the more decorative types, however, we find an extremely wide latitude of treatment.

Practical Applications of the Principles of School Lighting

The lighting of many of our school buildings is far below the standard prevailing in commercial and industrial establishments. This is indeed an unfortunate condition. The eye of the young child is in a formative state, and undue strain at such a period will surely react at a later date. Statistics indicate that a high percentage of absences and failures are due to defective eyesight. Conditions which tend to cause such effects should most certainly be remedied. The economics of the situation are apparent to any thinking individual. The city of Cleveland recognized that in many of the schools there existed marked opportunities for improvement, and employed a competent engineer, Prof. Dates, professor of Electrical Engineering, Case School Applied Science. Cleveland, to investigate the situation. After a survey of the field and study of conditions, he caused to be installed, under typical conditions many forms of suitable lighting units. These were tested under his direction as to efficiency and effectiveness. A study was made of such factors as are important in school lighting, including brightness, quality, glare, distribution and the like. As a result of this investigation, specifications were adopted for a standard unit and layout for the Cleveland schools. Professor Dates will outline his experiments and results at the convention.

In a paper to be presented at the annual convention of the Illuminating Engineering Society to be held at the New Ocean House, Swampscott, Mass., from September 25 to 28, Prof. Dates analyzes conditions as found, describes the methods of test, presents comparative figures on the different systems investigated, as well as the specifications finally arrived at. No one interested in school managament can afford to miss this paper and the discussion which will follow.

A Survey of Residence Lighting

Casual observation indicates that a large percentage of the homes throughout the country are inadequately illuminated, and further, that the average householder is unaware of the possibilities of modern lighting. Until recently, however, no exact data has been available indicating the extent of this inadequacy. Mr. Luckiesh, Director of Applied Science, Nela Research Laboratories, Cleveland, Ohio, who has devoted much thought to the question of residence lighting, sometime ago instituted a survey, results of which will be presented at the convention.. By means of a questionaire, he obtained data as the the actual installations in some fifteen hundred middle class homes throughout the country. Such features as the number of rooms, the type of lighting fixture in each room, the material which shades or envelops the light source, the number of sockets, the total wattage to be used, the number of portable lamps, brackets and convenience outlets, were tabulated and analyzed. The results of this survey are then compared with what the author terms "the conservative ideal average middle class home." The electrical industry, including the jobber and dealer, the fixture, wiring device and lamp manufacturers and central station representatives should be interested in the results of this analysis, which show that the average wired home to-day may be considered as only "half lighted." They will be interested in noting the character of equipment in service and the general tendencies as indicated by the findings.

Overcoming Daylight Reflections in Show Windows

The reflections in the plate glass of show windows created by a bright sky or by outside objects sunlighted to a much greater brightness than those within the display, often cause annoyance by very seriously interfering with the visibility of the display and correspondingly reducing the attractivness and effectiveness of the show window. It was found that the difficulty experienced with these reflections was overcome by lighting the objects in the display to intensities of the order of 1,000 to 2,000 foot-candles. A description is given in a paper by Ward Harrison and H. T. Spaulding, Engineering Dept. National Lamp Works, of a special lighting installation employing high power spotlights to concentrate artificial illumination on the important objects in the display. With a design of this character a practical installation showed that it was possible to obtain the necessary high intensities and do away with the objectionable reflections without an excessive wattage total. This paper should be of interest to the merchant who wishes to obtain the maximum return on his investment in show windows. It should prove of value to the central station solicitor in pointing out a way in which he can materially assist the merchant in one of his most serious problems.

Lighting Statistics of Representative Urban and Suburban Homes

The lighting industry is particularly fortunate in being able to obtain the data presented in a paper by Mr. Norman Macdonald. For some time the associated Edison companies have been conducting a survey, as indicated by the title. The object of this was to improve service conditions in the residential field. With the resources of these large companies to draw upon, a most comprehensive survey was possible. A field force of many individuals actually visited typical homes and obtained information regarding the various elements of their lighting system. The summation of this data is presented. Factors which should serve as guides in merchandising equipment or supplying service are now definitely known which heretofore were only roughly estimated. Among these are, the average number of sockets installed, the percentage of these actually in service, the percentage deemed superfluous, the percentage out of commission, the percentage in inaccessible positions, etc., the number of baseboard or convenience outlets in the average home, the type of lighting fixtures employed in the various rooms, the frequency of cleaning, the average wattage per lamp and the like. So many factors are presented that it is impossible to attempt to enumerate all of these in a brief synopsis. One should read the paper to gather the full import of these data.

Lincoln-Sangamo Demand Energy Meter

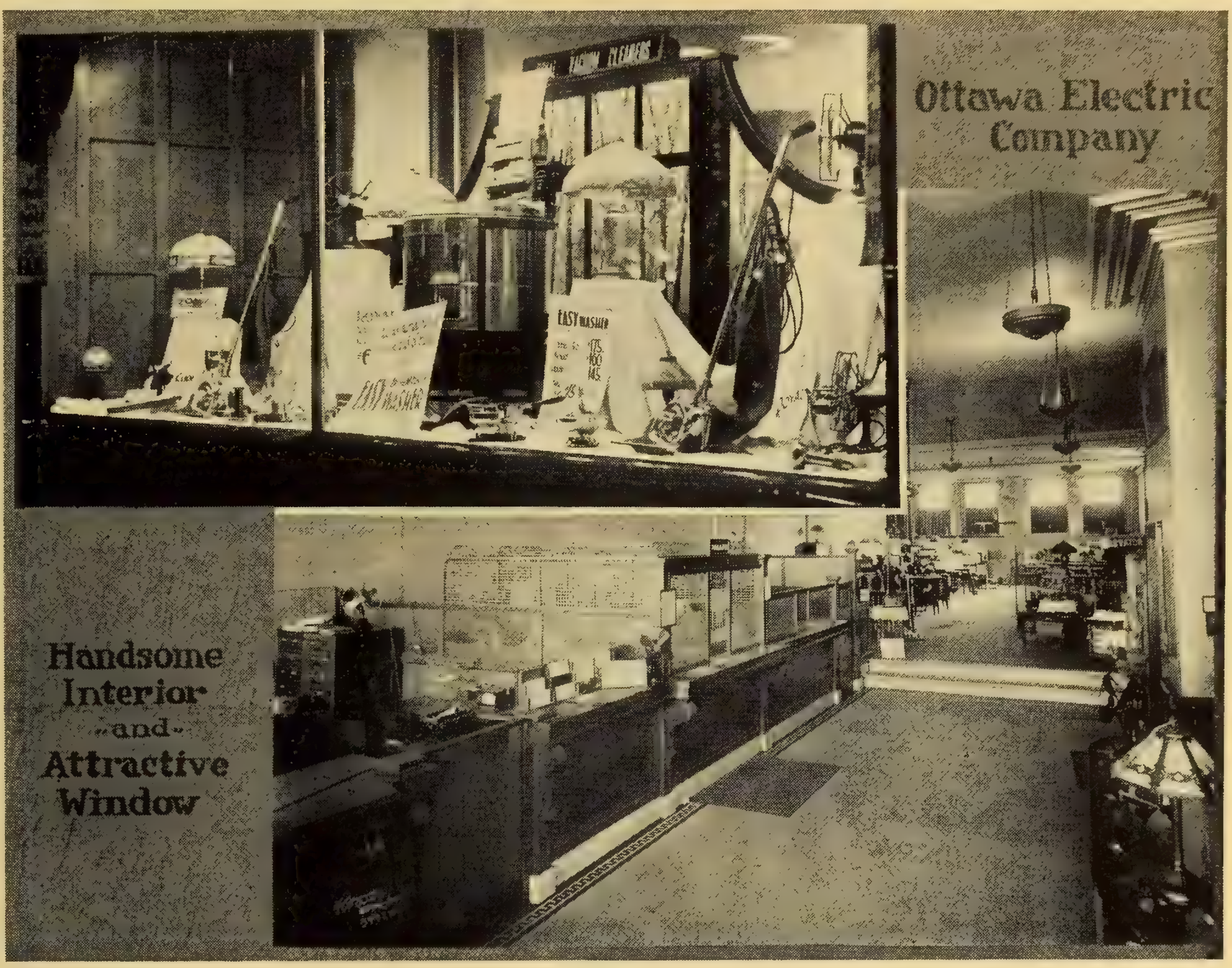
The Lincoln Meter Co., Ltd., and the Sangamo Electric Co. of Canada, Ltd., announce an arrangement whereby their two instruments can be purchased in the form of a single meter. The combined meter is to be known as the "Lincoln-Sangamo Demand Energy Meter." It will be distributed by the Sangamo Electric Co., Ltd., Toronto, and The Lincoln Meter Co., Ltd., Toronto. The arrangement will interest both the supplier and consumer of electric current. Students of rate making agree that the measurement of both actual consumption and demand is the only fair means of billing a current consumer. That is, the measurement of either quantity, alone, is insufficient. **How** a customer uses his current as well as **how much** is vital. Both quantities are accurately measured by the Lincoln-Sangamo Unit. Every customer is billed on a basis fair to all parties concerned. Power-factor is taken into consideration, as the Lincoln meter measures demand on either a watt or volt-ampere basis. A small switch contained within the instrument makes this available over a wide range of power-factor. No one is penalized in case another user on the same line uses current incorrectly. The central stations fixed charges are fairly distributed.

The single mounting of the two instruments facilitates installation and effects economies not possible with the individual meters. It is specifically stated that there is no mutual ownership or consolidation of the two concerns. The new selling arrangement will not affect the individual selling of either instrument for separate installations.

Jewell Measuring Instruments

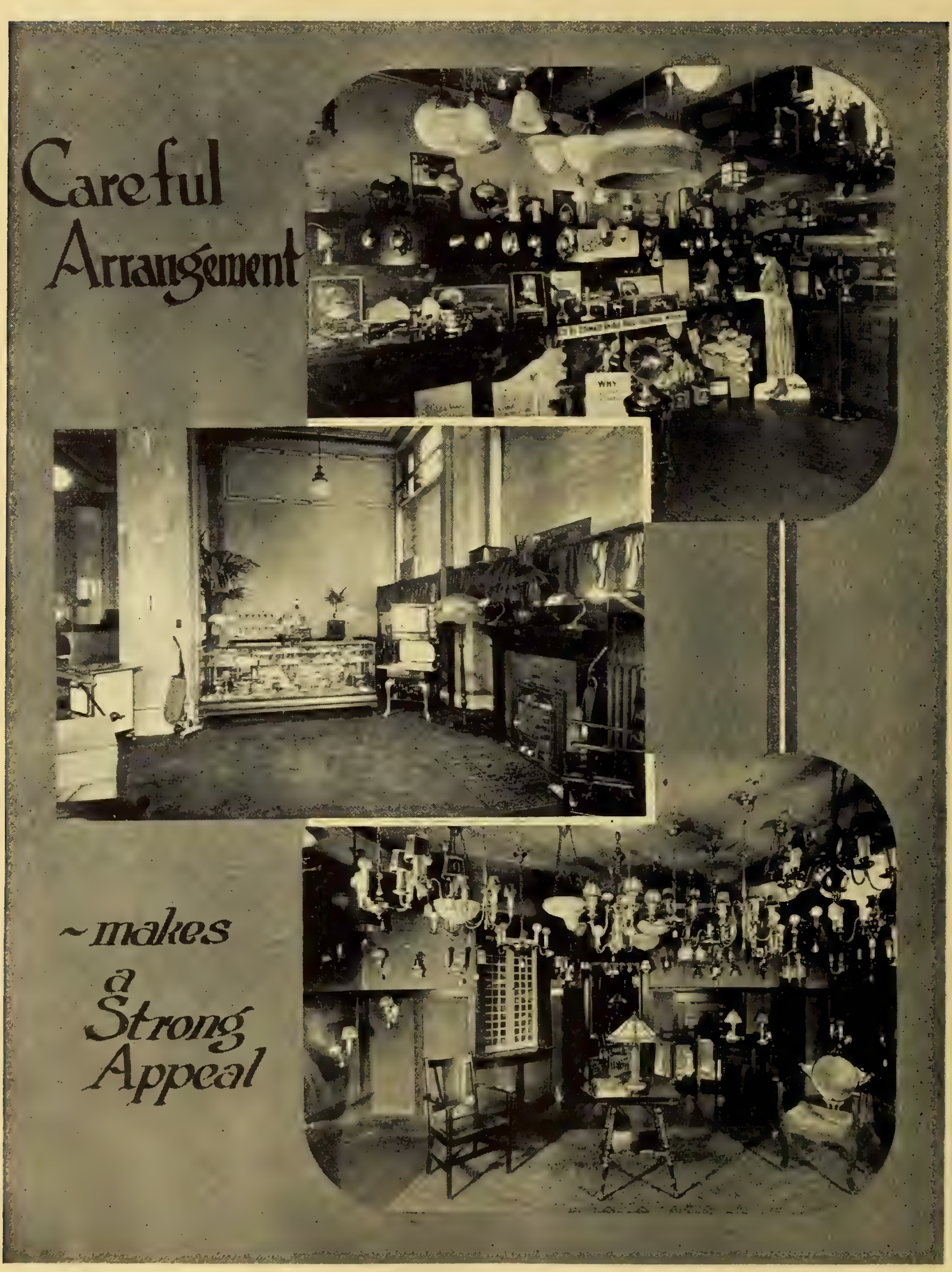
The Jewell Electrical Instrument Company, of Chicago, have recently added to their line of electrical measuring instruments and issued an entirely new catalog. Each instrument is clearly illustrated and its applications, size, scale length, accuracy and general characteristics described in detail. In the back of the catalog detailed dimensional drawings are shown of each instrument together with full size scales and complete listing of readings and prices. Probably the most important addition to the Jewell line has been their new miniature movements for a.c. and d.c. instruments, both switchboard and portable. Their new polyphase watt-meter development also deserves creditable comment. In the radio field, in addition to their widely known and recognized line of uniform size instruments they have developed several special instruments, such as their Triplex filament meters, wavemeters, and A-B battery testers. The company have also been adding new representatives. In addition to Filer-Smith Machinery Company at Winnipeg, the Jewell line will be sold by Henry Engineering Company at Toronto.

Better Merchandising



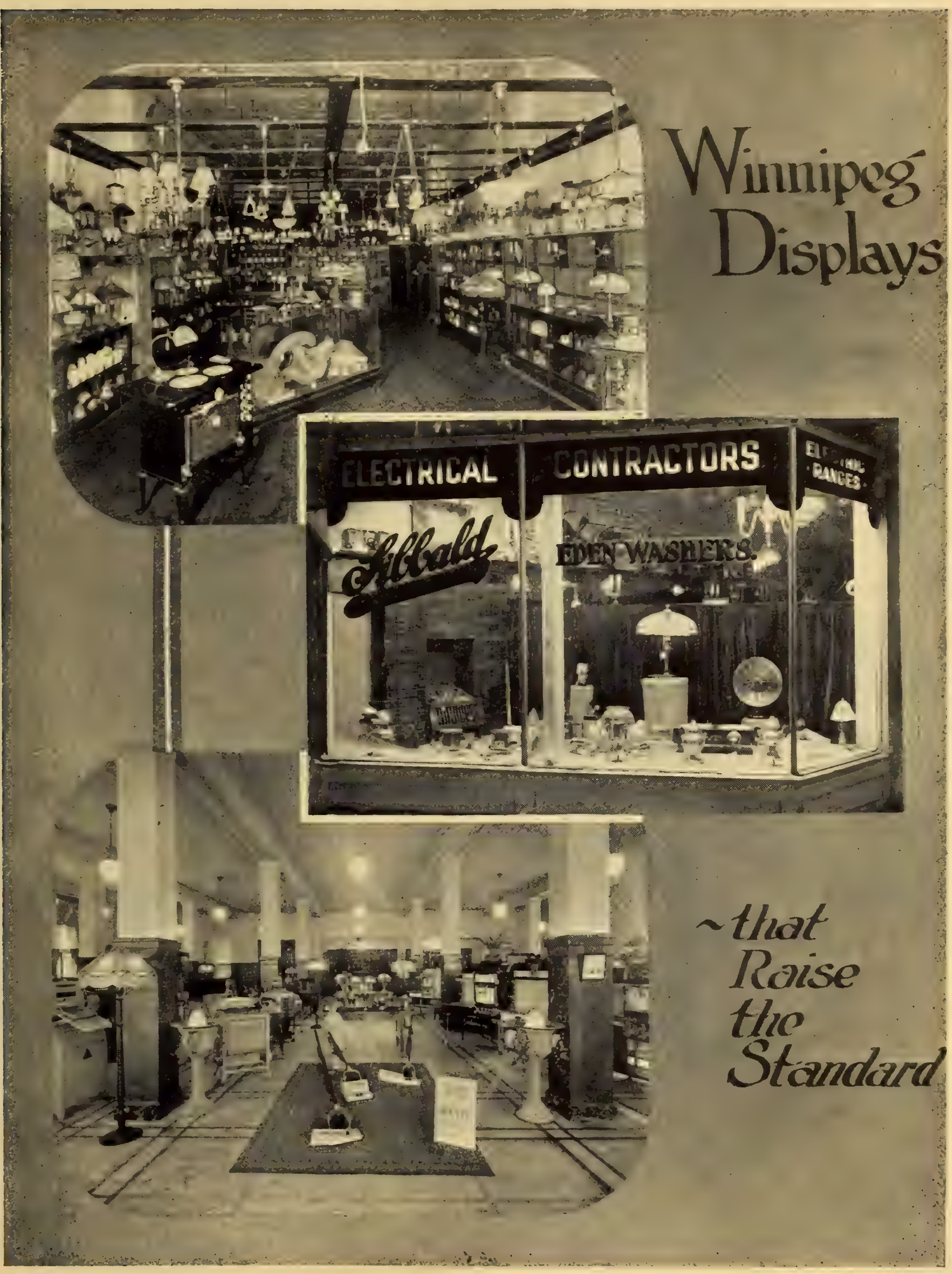
The attractive Offices and Showrooms of the Ottawa Electric Company are shown in one of the views above. The other (upper) view reproduces a typical window display. This company makes a strong bid for the appliance business of its customers. Both windows and showrooms are scrupulously clean and the equipment is artistically displayed and courteously demonstrated.

Better Merchandising in the Prairie Provinces



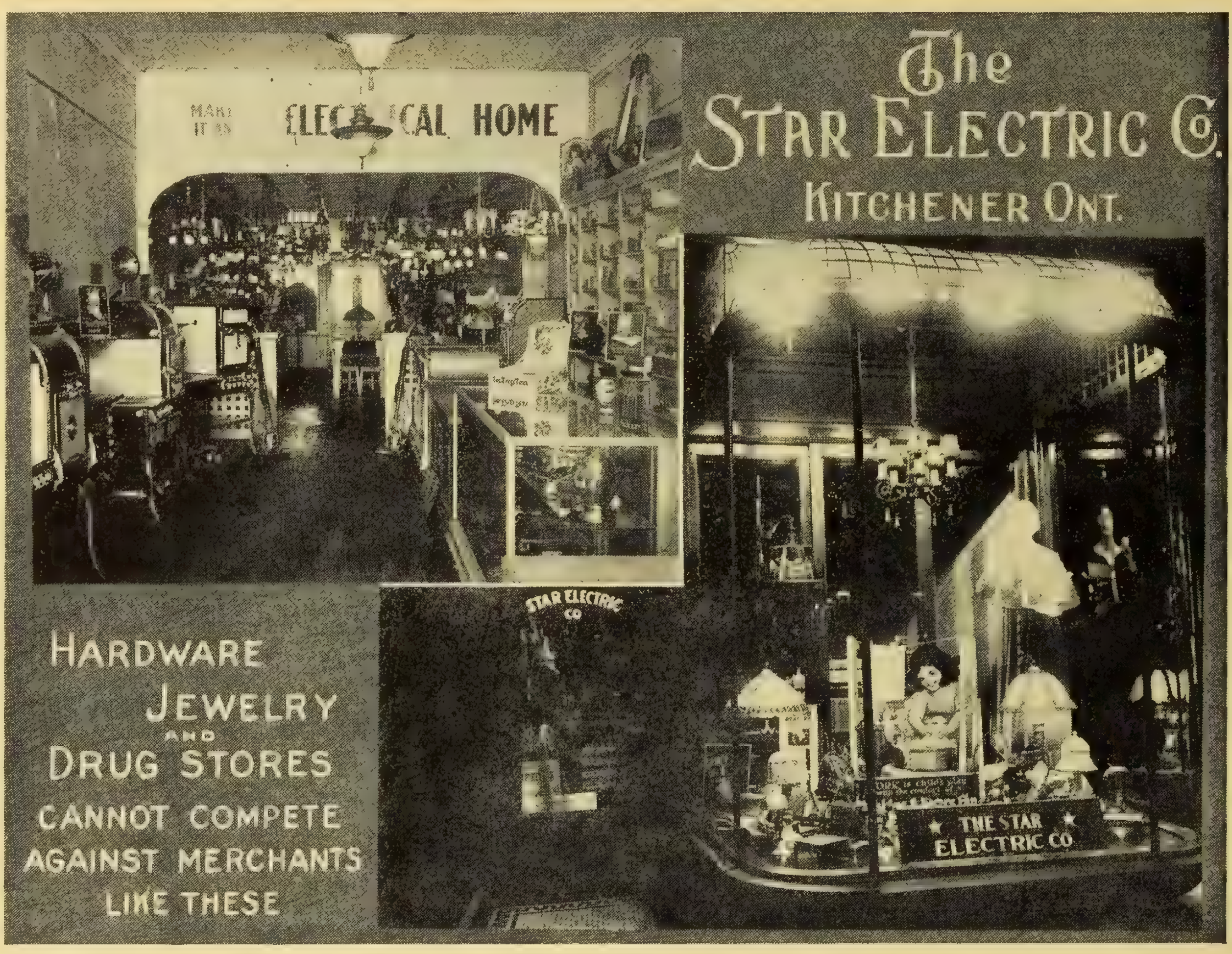
Merchandising in Winnipeg—Upper, Lighting Electric Service; Middle, Winnipeg Electric Railway Co.; Lower, McDonald & Willson Lighting Co.

Showing Some of the Finest Stores on the Continent

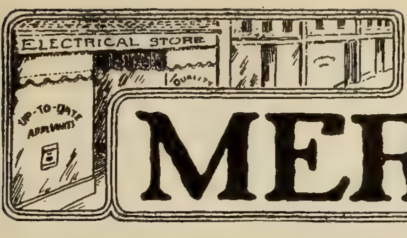


Merchandising in Winnipeg—Upper, Winnipeg Engineering Co.; Middle, Sibbald Electric Co.; Lower, Winnipeg Hydro-electric System

Minding Our Own Business


MAKE IT AN ELECTRICAL HOME
The STAR ELECTRIC Co.
KITCHENER ONT.
HARDWARE JEWELRY AND DRUG STORES CANNOT COMPETE AGAINST MERCHANTS LIKE THESE
STAR ELECTRIC CO
THE STAR ELECTRIC CO.

Where stores such as that illustrated above are established, there is no danger of the electrical business being stolen by other trades. Kitchener citizens "buy electric goods in electric stores" because these stores are more attractive and give service.



BETTER MERCHANDISING

Was Rip Van Winkle an Electrical Man?

"We bought this house six years ago and have never had a call—either personal or telephone—from an electrical contractor or an electrical merchant during all that time. Even after the 'Electric Home' campaigns when we naturally expected the electrical industry would make some special effort—and when we were certainly most favourably inclined to make some changes and additions—not a single ring of the door bell. I cannot understand you electrical people. Are you sure you understand your business?"

What do **you** think of this arraignment of the electrical industry by a wide awake Toronto housewife?

Does it apply only to Toronto or is it also true of **your** town?

Answer the question as best you can—are you sure you understand your business?

The above statement shows that the public are watching us. The average housewife knows that the proper place to sell electrical wiring is in the house—where the wiring goes; the same with appliances. When she fails to get the attention she expects, she criticizes—"you don't know your business."

ARE YOU SURE YOU UNDERSTAND YOUR BUSINESS?

Co-operation in Electrical Industry of British Columbia

"Fieldman" a Feature of the System—Propaganda Against Cheap Installations—Preparing for Electrical Home Exhibit

By REY E. CHATFIELD*

Co-operation in the Electrical Industry in British Columbia has been given a thorough tryout for a year, ending August, 1922. Certain very definite results have been obtained, after many obstacles were overcome through the untiring efforts of the leaders in the industry. The Electrical Service League of British Columbia was formed in the summer of 1920 under the name of the British Columbia Electrical Co-operative Association, which name was later changed to the present one. In July, 1921, a fieldman was engaged and active intensive work started. The first work of the fieldman was the reorganization of the contractor-dealers' association. Several months of effort was necessary to accomplish this; however, the association was finally put on a firm basis. This was followed by a co-operative advertising campaign for the Christmas trade, promoting the sale of appliances, which lasted six weeks, and was a pronounced success.

The activities of the League and the fieldman may be best presented by a summary of the work done since the first of the year, beginning January 1st, 1922. In order that co-operative efforts in the industry may be successful two things are necessary; active participation in co-operative work by the members of the industry and actual field work by the fieldman. Sixty-seven per cent of the time of the fieldman has been spent in the field during the last seven months. The fieldman paid 302 calls upon contractor-dealers, 71 on wholesale representatives and 99 on representatives of the central station, manufacturers representatives, architects and others interested in co-operative work. During the same time 86 contractor-dealers called at the office of the fieldman, 23 representatives of wholesale firms and 114 central station representatives and others. The Advisory Council held 23 meetings during this same time and the contractor-dealers' association held 14 meetings, which were attended by the fieldman.

For ease in discussion, I propose to divide the work into four subdivisions:—

1. Organization,
2. Educational work within the industry,
3. Publicity,
4. Underwriters and Inspection Departments.

The work of organization of the contractor-dealers of established standing in the community was accomplished by reviving interest in the local branch of the National Association of Electrical Contractors and Dealers and was in no way unique. Organization of the small non-association contractors sometimes called the "curbstone contractor" was an unusual and difficult undertaking. These men who for the most part are ex-union men, or men who still carry a union card and do contracting when not working as journeymen, had a great distrust of the Service League and a still greater suspicion of the employing contractors, because of past experience of labor disputes, etc. This, together with the requirement that a National Association member must have a definite place of business, prevented such men joining the National could they have been persuaded to do so. If the effort to organize and educate this class of contractor was to succeed a separate organization had to be started.

Starting with a group of three men attendance at preliminary meetings finally reached thirty or more, and with this as a basis the B. C. Electrical Contractors Association was formed. This group share the meeting place with the National Association members, holding their meetings on alternate Tuesday evenings. Membership in neither of the two contractor organizations is 100 per cent; however, each organization has a representative group.

Central station representatives, manufacturers and jobbers meet weekly with the Advisory Council so that a loose organization of the industry has been accomplished. With a loose organization of the industry effective education of members of the industry could be started. Fully eighty per cent. of the failures in the contractor-dealer business have been brought about by an ignorance of fundamental business principles. With a view to teaching such fundamentals, bulletins were issued fortnightly and then monthly, from the office of the secretary-manager, dealing with such subjects as "Overhead," Method of Determining Overhead, Application of Overhead Percentage, Merchandise Turnover, Turnover on Accounts and kindred subjects. Following the publication of these bulletins blackboard lectures by the fieldman at contractor-dealer meetings of both the National Association members and independent contractors, brought the points home to the individual contractor.

Come to the Convention, Nov. 13 and 14.

Thus the fieldman was enabled to go to the store or office of the contractor-dealer or contractor and apply the principles to the particular business of the individual. With this as an entering wedge the fieldman has been called in the last seven months to revise, reorganize or install new systems in accounting, including cost systems, for twenty contractors in Vancouver and New Westminster. Each system has been developed to fit the particular business of the individual, and the type of accounting varies from one installed for a small contractor based on three algebraic equations and having columns labelled "plus" and minus," to the system installed for one of the largest contractors who employs an expert bookkeeper and has his accounts audited by a chartered accountant.

The installation or revision of the accounting system of an individual contractor enabled the fieldman to stress the value of discounting bills with the wholesaler; of prompt collection of accounts and of keeping accurate job costs. Particular attention was given when necessary to the quantity purchase on the part of the contractor when small purchases would be more profitable. The false lure of the extra five per cent for a quantity purchase has resulted in overstocking by many contractors. This work was so effective that salesmen from one jobber reported that they could follow the steps of the fieldman by the quantities ordered by the various contractors. This might seem a hardship at first to the wholesale house but small accounts promptly paid are more desirable than larger accounts of dubious worth.

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*Secretary Manager B.C. Electrical Co-operative Association.

During the same period the fieldman has been able to assist in the re-arrangement of four contractor-dealer stores. One store had been completely changed from the show windows to the shop. The same firm had the fieldman install a complete accounting system, which has been in successful operation since January fifteenth. Weekly change of window display has also been adopted by several contractor-dealers who heretofore had not used their show windows advantageously.

With the small residence wireman the educational work has not progressed so far, although a number of lectures on the "Cost of Doing Business" have been given, as well as several lectures on estimating, given by one of the National Association members. To date however, progress has been slow, but the fieldman has installed one accounting system complete and one job cost system for these contractors; and within the next thirty days will complete the installation of six more systems.

An effort has been made to improve the salesmanship of the contractor-dealer and to stress the sale of standard materials and quality workmanship as against cut prices.

Lectures to contractor meetings, individual instruction, as well as group instruction in salesmanship, have been given by the fieldman and by the more successful contractors.

Convention of Contractors and Dealers in Toronto, November 13 and 14

Early in the Spring the radio craze hit Vancouver and found the contractor-dealer utterly unprepared to handle this class of equipment. Under the auspices of the Electrical Service League sixteen lectures on the principles underlying speech transmission and reception were held. Speakers were furnished by the manufacturers of radio telephony apparatus and great stress was laid on the technical information necessary to successfully merchandise this apparatus. These meetings were held twice a week and at the conclusion of the series of lectures the dealers frequently met in the League office to settle, co-operatively, little problems arising in the merchandising of radio equipment.

The next phase of the work of the League since the first of the year is publicity. Early in March at the Vancouver Building Exhibition the central station, manufacturers, jobbers and contractor-dealers maintained a co-operative Electric Home demonstration. Three rooms of an Electric Home were built and furnished completely, and equipped with appliances. The appliances were chosen by lot and all name plates covered. Volunteer demonstrators were furnished by the industry at large. No Vancouver electrical firm maintained a separate exhibit, but all united to make the League exhibit a success.

Some 10,000 copies of a pamphlet were distributed telling the story of a proper wiring installation. So successful was this exhibit that even today prospective builders call at the League office for information regarding illumination and wiring. Plans have been drawn for an industrial lighting exhibit to be built this fall. In this venture the League has the hearty support of the Provincial Workman's Compensation Board.

During June a short co-operative advertising campaign for the promotion of the sale of appliances as wedding gifts was carried on, however, this campaign did not bring the desired results as it was not properly backed up by newspaper advertising.

To combat the cut price wiring installation the League issues a pamphlet "The Cost of the Lowest Bid," which is mailed to every person taking out a building permit.

At the same time the fieldman supplies a column a week of propaganda against cheap wiring installations to the Journal of Commerce. This paper is the trade paper for the entire building trade and a copy of the issue containing this propaganda is also mailed from the Journal office to every person taking out a building permit. This hits the builder from two angles, both decrying the practice of installing cheap, inadequate electric wiring. These articles and the Bulletins issued from the League office have been rather widely copied by journals in Canada and in the United States. The fieldman for the League has also furnished the Pacific Coast Lumberman an article a month on Industrial Illumination, Electricity in the Logging Industry, Electricity in the Mills, etc.

All of this newspaper and magazine space has cost the League nothing and has spread the message of "Do It Electrically" throughout the Profince.

Altogether the League has received 375 inches of publicity as reading matter, which valued at the ordinary advertising rates would have cost the League approximately $1,000 —in addition to $500. worth of advertising space that has been purchased.

As a final effort the League will exhibit Vancouver's first Electric Home during the latter part of September. Funds for the publicity of this have been raised through the co-operation of Messrs. Rush and Read, owners; the building trades of the city; and the Electrical Service League. Something in excess of $2,000 has been raised for the publicity fund, of which amount $500. has been contributed directly by the Electrical Service League. The Home is situated in Shaughnessy Heights district, Vancouver's fashionable residence district and is a model home throughout. The League feels the Electric Home will do much to educate the public to the need of adequate wiring by qualified contractors for the modern home.

This resume of League work has been compiled that other cities contemplating the organization of co-operative work in the electrical industry may have some idea of the scope of this work and the methods used by one district in solving some of the problems which are common to the industry all over the continent.

Correction

An item in our September 1st. issue, under the heading "Ferguson. Pailin Ltd., Enter Canadian Field" contained a slight error, two words being omitted. The fourth line, third paragraph, should have read "formerly chief switchboard and switching equipment draftsman, and later designs engineer etc."

Fuel Saving Possibilities

Report No. 10 on "Fuel Saving Possibilities in House Heating," written by L. M. Arkley, M. Sc., M.E.I.C., and James Govan, M.R.A.I.C. and published by the authority of the Honorary Advisory Council for Scientific and Industrial Research, Ottawa, was written for the purpose of bringing to the attention of house owners and builders, data which would enable them to build more scientifically, and at the same time economize on fuel consumption.

The joint authors have brought out a number of points that previously have received very little attention; furnaces, chimney and wall construction and the ventilation of buildings are dealt with and many facts explained that are little known to the average house builder.

Coast News is—Co-operation and Optimism

C. C. Carter of Vancouver will shortly commence work on the $20,000. wiring installation for the new government hospital at Essondale, B. C.

* * *

Hawkins & Hayward of Victoria, B. C. have just been awarded a $33,000 contract for the wiring of the new Royal Jubilee Hospital, Victoria, B. C.

* * *

The Firm of Smith, Robinson & Co. Ltd. of Vancouver have just been awarded the contract for the installation of the electrical equipment in an addition to the Government Grain Elevator at Vancouver, B. C.

* * *

All railroad trackage on Industrial Island, a government owned industrial centre in False Creek, Vancouver, has been electrified. The work of installing the poles and trolley lines has been completed by W. W. Fraser of Vancouver. All switching and hauling will be done under contract by the B. C. Electric Railway Co. Ltd.

* * *

R. N. Dicer has been awarded the contract for wiring and apparatus installation for the new bakery being erected by Shelly Bros., Vancouver. It is reported that the contract was let for a figure around $70,000. The bakery is to be a four-storey reinforced concrete building, completely equipped electrically. All baking machinery will have individual power units regulated by dual control—separate control at each machine and remote control through switches in the engine room.

* * *

The Harbor Board of Vancouver has just called for tenders for the supply and installation of the most complete electric equipment and cargo lifting plant for their new $2,000,000 Ballantyne Pier. The equipment specified by Mr. A. D. Swan, harbor engineer of Montreal, consulting engineer for the Harbor Board, includes semi-portable electric cranes, electric freight elevators, electric escalators or inclined conveyors, electric capstans, tractors and trailers .

This very complete electrically operated equipment together with an elaborate lighting system will allow cargo to be handled from ship to dock, or from dock to ship, at any hour of the day or night and will give Vancouver the best equipped dock on the North Pacific Coast.

It is roughly estimated that this equipment will cost in the neighborhood of $250,000. Bids on this equipment will be received up till noon of Monday October 2nd, 1922.

Co-operation to the Fore

Co-operation in the electrical industry in British Columbia has taken on an added impetus since the visit of Laurence W. Davis, representative of the National Association of Electrical Contractors and Dealers, and Kenneth A. McIntyre, Canadian representative of the Society for Electrical Development, Inc. of New York. Arriving in Vancouver Monday morning, August 14th, these two gentlemen were the guests of the Advisory Council of the Electrical Service League of British Columbia, at which time the Council benefitted by their experience, particularly in solving the problems attendant upon an Electric Home exhibit. Monday evening they addressed representatives of all branches of the industry at a dinner given under the auspices of the Electrical Service League of British Columbia. Mr. McIntyre spoke on "The Value of an Electric Home to the Electrical Industry" and Mr. Davis on "Co-operative Associations in the Electrical Industry." Tuesday evening Mr. Davis addressed a joint meeting of the members of the National Association of Electrical Contractors and Dealers and members of the small non-association electrical contractor's club.

The direct result of these meetings in Vancouver has been to increase membership in the National Association of Electrical Contractors and Dealers and to gain the more united support of the contractors for the Electrical Service League of British Columbia.

Victoria Interested, Too

Wednesday Mr. McIntyre and Mr. Davis, with Mr. Sid Smith, assistant district manager of the Canadian General Electric Co., W. W. Fraser, past president of the local branch of the National Association of Electrical Contractors and Dealers and Rey E. Chatfield, secretary-manager of the Electrical Service League of British Columbia, went to Victoria and addressed the members of the Electrical Association of Victoria, B. C. at a dinner held in the Dominion Hotel. Previous to this visit to Victoria, the contractors of that city could not be interested in association work. At the conclusion of the dinner every contractor present became a member of the National Association. A one hundred per cent meeting of the industry in Victoria, the contractors of the city joined the Association to a man. In addition the central station took out an association membership in the National association.

Many from Out-of-town

Through the kindness of Mr. S. J. Halls we also have the following report on the Victoria Meeting:

The annual dinner of the Victoria (B.C.) Electrical Association was held at the Dominion Hotel, Wednesday, August 16th., when some thirty (30) members sat down and enjoyed an excellent repast. Two visiting electrical men, Mr. L. W. Davis, special representative of the National Association of Electrical Contractors and Dealers, of New York, and Mr. Kenneth A. McIntyre, Canadian representative of the Society for Electrical Development, made particularly interesting speeches during the course of the evening. Among the out of town friends at the gathering were noticed Mr. W. W. Fraser, Mr. Sid Smith, Mr. R. E. Chatfield of Vancouver, and Mr. John Muir, electrical inspector for Saanich.

The officers of the organization are Mr. A. T. Goward, hon. president; S. J. Halls, president; R. T. Murphy, vice-president, and H. E. Miller, secretary-treasurer.

Electrical Contractors' Ass'n. of B. C.

After months of effort on the part of the fieldman of the Electrical Service League the small residence wiremen of Vancouver have organized the Electrical Contractors Association of B. C. This organization is entirely independent of any existing electrical contractor association but is formed for the specific purpose of bettering conditions among the residence wiremen. The following officers were elected August 1st, to serve for a period of six months:—president, A. M. Buck; secretary-treasurer, Jos. Holt; executive committee:—H. B. Steeves, Mr. Johnson of Johnson Electric, and Mr. Safford of Crosby and Safford. Meetings are held in the rooms of the National Association on Tuesday evenings two times a month.

Contractor-Dealers Organize in Regina

In our last issue we made brief mention of the recent organization meeting of the contractors and dealers in Regina. The following report from Mr. H. Naismith, secretary of the new association, covers the ground more fully. It is especially satisfactory to notice that eleven applications, with cheques attached, were handed in the same evening:

"The electrical contractor-dealers and central station men of Regina, Moose Jaw, Saskatoon, Indian Head and Grenfell took advantage of the visit to Regina, Sask., on August 3rd and 4th, of Mr. Lawrence W. Davis, special representative of the National Association of Electrical Contractor-Dealers, and Mr. Kenneth A. McIntyre, Canadian representative of the Society for Electrical Development, to hold a "Get Together" dinner in the Regina Trading Company's banquet hall. Mr. J. R. Young, of the Sun Electric Ltd., Regina, presided at the meeting. Music was furnished by the Capitol Theatre orchestra. Community singing was led by Mr. C. M. Anderson (Artie Fatbuckle) of the Northern Electric Co. Ltd.

Mr. J. R. Young

"Mr. Davis spoke at length on the contractor-dealer's problems. His address was well received, as he handled the question in a very able manner. Mr. McIntyre outlined the aims of the Ontario Association, the Hamilton and Toronto "Electrical Home" campaigns, and the work of the society for electrical development. Eleven applications with cheques attached were handed in that evening. A vote of thanks and appreciation was extended to Mr. J. A. Daly, manager of the Northern Electric Co. Ltd., and Mr. E. C. Brown, local representative of the Canadian General Electric Company, for their labors in connection with the "Get Together" dinner, and the successful way in which they brought together, on such short notice, contractor-dealers within a radius of two hundred miles.

"Friday morning a party including Messrs. Davis and McIntyre took in the sights of the Saskatchewan Provincial Exhibition. Both gentlemen enjoyed themselves thoroughly and expressed surprise at the greatness of Regina's annual exhibition—in fact if I remember correctly Ken McIntyre remarked that Toronto National Exhibition resembled our exhibition very much."

Beatty Bros., Fergus, Ont., have acquired the British Empire rights for the manufacture of the 1900 washer. The washer will be manufactured at Fergus, Ontario, and distributed by the branches of Beatty Bros. These distributing centres are located in London, Eng., London, Ont., St. John, Montreal, Toronto, Winnipeg, Edmonton and Vancouver. 75 salesmen are employed by this company.

New Diesel for Vernon, B.C.

A 200 horsepower diesel engine extension to the city power plant of Vernon, B. C., is now completed and giving very satisfactory results. The engine was built by Messrs. Mirrlees, Bickerton & Day Ltd., Stockport, England, and is direct connected through a flexible coupling to a 175 kv.a. 2,300 volt, 60 cycle, 3 phase generator, with direct coupled exciter supplied by the Canadian General Electric Co., Vancouver, B. C. The total capacity of the Vernon plant is now 925 horsepower and makes for a very fexible installation. The extension was under the direct supervision of and was engineered by the City Superintendent, Mr. S. H. Excell.

Enderby Installing Electric Plant

The City of Enderby has let the contract for a municipal lighting plant which will consist of an 85 horsepower semi-diesel oil engine and belt driven generator, 75 kv.a. 2,300 volts, 3 phase, 60 cycle, being supplied respectively by the Canadian Allis-Chalmers Co., and the Canadian General Electric Co. The latter company is supplying the switchboard, lightning arresters and other accessories. This plant is being engineered by S. H. Excell, city superintendent of Vernon, B. C., and generally supervised by him till completion.

Good Reason for Optimism

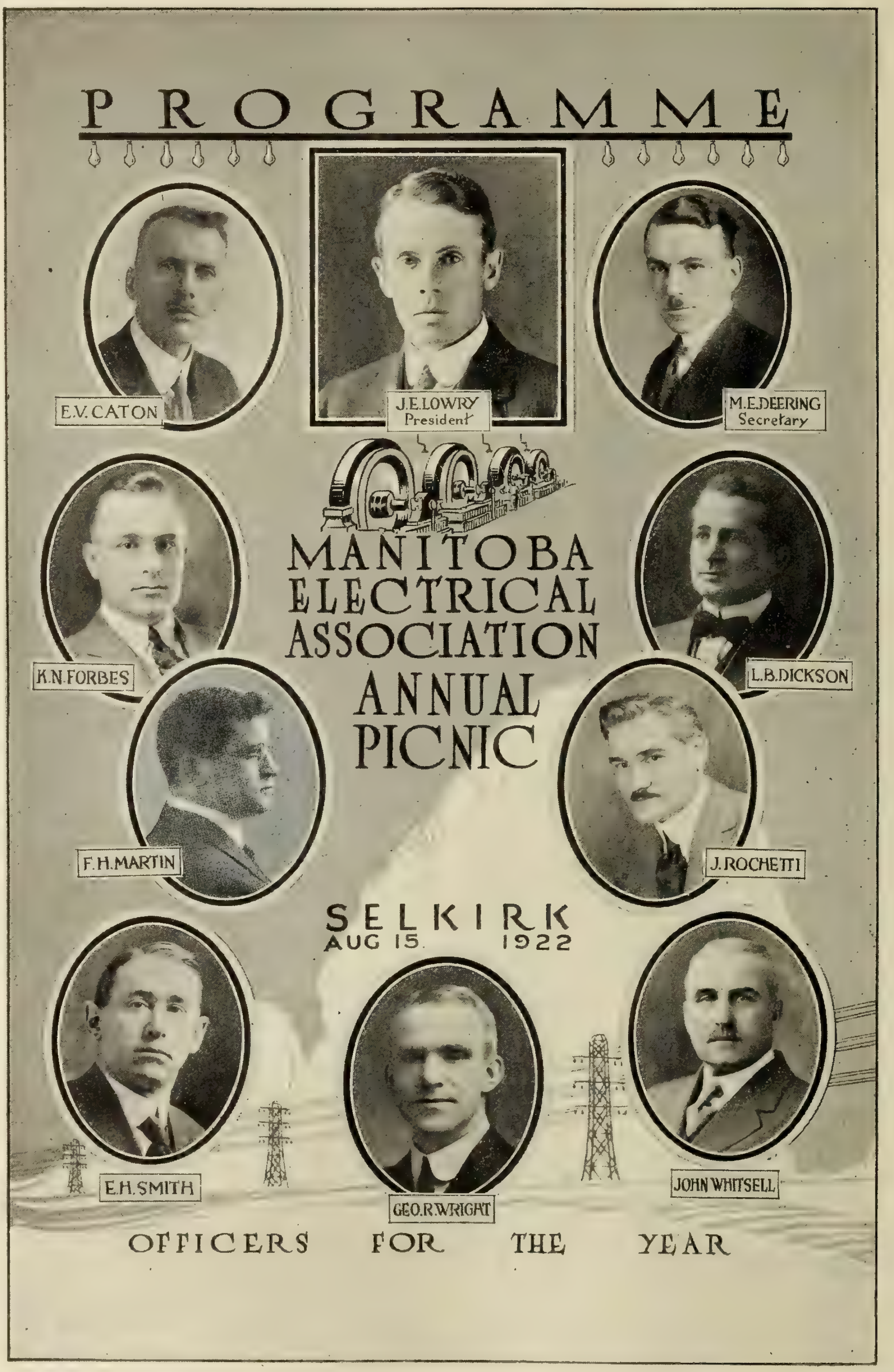
As an indication of the way business is coming back, Mr. B. S. Barnard, general sales manager and vice-president of the International Clay Products Company, New York, reports that recent orders include over a million feet of conduit from the Bell Telephone Company, and upwards of 400,000 feet for the Hydro-electric Power Commission of Toronto. The International Clay Products Company succeeded the Clermont Sewer Pipe Company, and it is the Clermont conduit, manufactured from pure fire clay, that is being supplied on the above orders. Mr. Barnard reports that he has booked orders sufficient to keep the Clermont plant on a 100% operating basis for the next six months, fine orders having been received also from the Western electric Company, Inc.. the Niagara Falls Power Company, the Northern Electric Company, and others.

"Hydro" Issues Supplementary Notice

Gentlemen:—As some of the jobbers and contractors still have small quantities of the 5½ old code split knobs in stock, which they were unable to dispose of (within the time limit) September 1, 1922, we have deemed it advisable to advance this date from September 1 to November 1, 1922. After that date, only approved new code knobs, that are built to conform with the specifications for porcelain insulating devices, as issued by the Approval Laboratory, under date of May 7, 1921, will be accepted.

We also take this opportunity of advising that switch and receptacle plates of substandard thicknesses (.025 and .032 inches) will not be accepted after November 1, 1922. Approved switch and receptacle plates of at least 0.040 inches in thickness will be required.

Kindly arrange to dispose of your present stocks of substandard knobs, switch and receptacle plates by the foregoing date, as we feel that ample notice has already been given the Trade regarding these matters, and would refer you to Approval Laboratory Bulletin No. 18, May 7th, 1921, (revised March 1st, 1922,) and Bulletin No. 10 of June 11th, 1920, October 29th, 1920 and August 26th, 1921, copies of which may be had by application to Mr. W. P. Dobson, Laboratory Engineer, 8 Strachan Avenue, Toronto.



PROGRAMME

E.V. CATON

J.E. LOWRY
President

M.E. DEERING
Secretary

MANITOBA
ELECTRICAL
ASSOCIATION
ANNUAL
PICNIC

K.N. FORBES

L.B. DICKSON

F.H. MARTIN

J. ROCHETTI

SELKIRK
AUG 15 1922

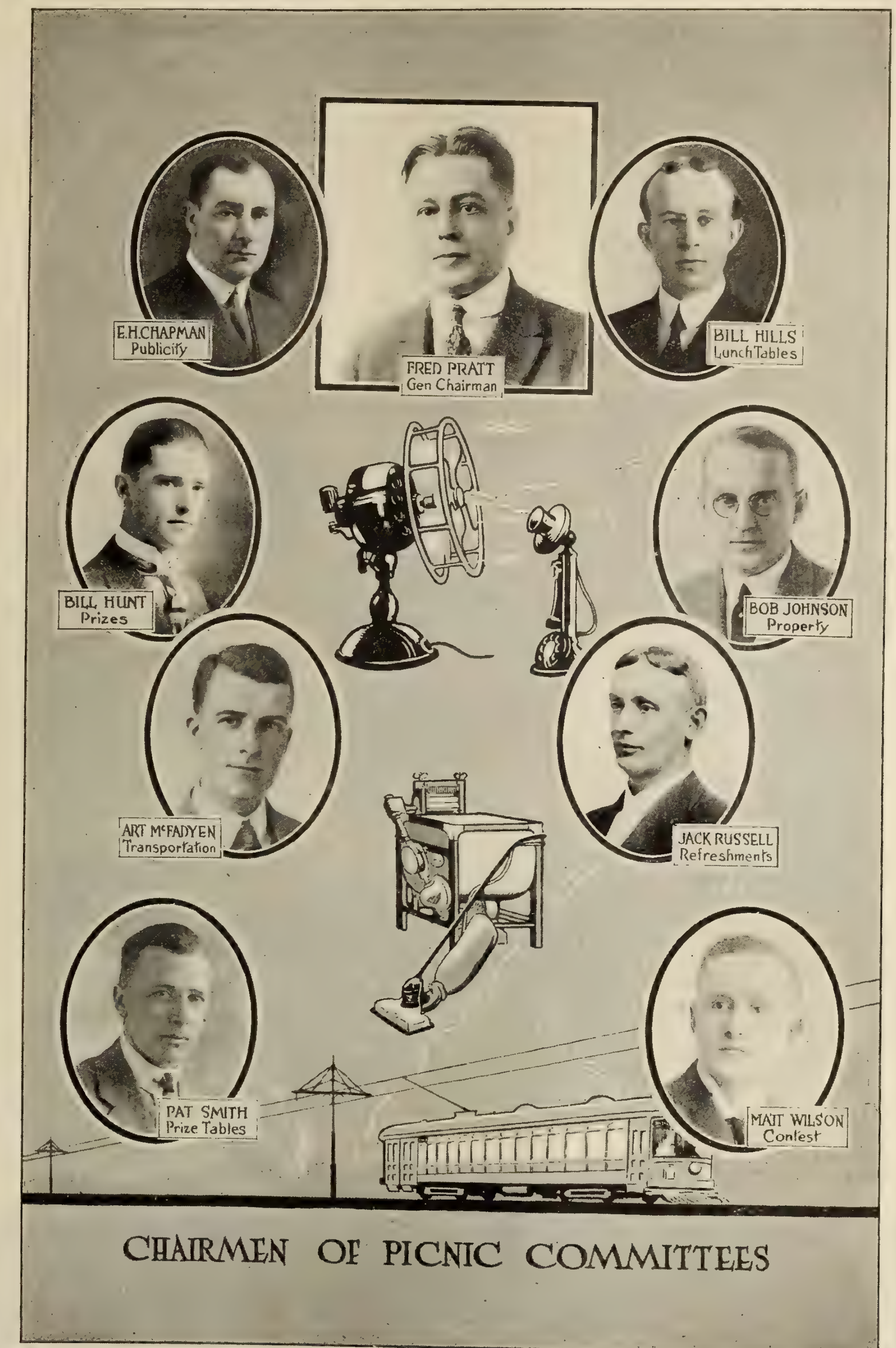
E.H. SMITH

GEO. R. WRIGHT

JOHN WHITSELL

OFFICERS FOR THE YEAR

Cover of twenty-eight page programme of Manitoba Electrical Association—The Association should flourish under the guidance of such officers as are pictured above



The back cover of the programme—Judging from results, the Committee pictured above, which arranged the Selkirk Picnic of the Manitoba Electrical Association, was carefully "Hand picked"

Manitoba Electrical Association in Gay Mood

Annual Picnic Consisted in Entertaining the Orphans of the City — Radio Broadcasting and Games of Fortune—All Members Worked Like Trojans

On Tuesday the 15th August, over 300 orphans from the various children's homes spent a most enjoyable time as guests of the Manitoba Electrical Association at Selkirk Park. The Winnipeg Electric Railway Co., had sufficient cars on hand to carry the crowds from Winnipeg to Selkirk. On arrival at the park about 11, a.m. every one was ready to indulge in the splendid programme of sports that had been arranged and during the morning most of the children's events were run off, the afternoon being devoted to the races for the grown ups, as well as baseball games for both young and old. The prizes were donated by the various electrical firms, for the adults, and prizes for the children were bought by the Association.

One of the great attractions of the day was a radio broadcasting concert of the Manitoba Free Press; for this a Northern Electric tube set with two stages of amplifiers, with a Western Electric loud speaker. was used, and every word in the news service and every note in the music was distinctly heard. Another strong attraction was a wheel of fortune, which was in charge of Art. McFayden, and Bill Hunt, A considerable amount of money was raised in this way, in fact Art. had to close up shop, as he ran out of dolls, boxes of chocolates, etc.

The Chairmen of the Picnic Committees were as follows, Fred Pratt, general chairman; Bill Hills, lunch tables; Art McFayden, transportation; Pat Smith, prize tables; Bob Johnson, property; Jack Russell, refreshments; Bill Hunt, prizes; Matt Wilson. contest; and E. H. Chapman, publicity. Great credit is due Fred Pratt, who worked like a "Trojan" for weeks before the picnic.

Among the various ways that the Association found to raise funds to help defray the expenses of the day's outing, was that of publishing a picnic programme, which contained twenty eight pages, and contained electrical advertising only. A nice profit was shown from this source. The front cover contained photographs of the executive, and the back cover photographs of the chairman of the picnic committees, reproductions of both being shown herewith. At the conclusion of the supper, every orphan was presented with a present well worth having, also the attendants of the Homes, and each Home received an electric heating pad.

Messrs. Cochrane Stephenson & Co. Ltd., have opened an office at 608 Pacific Building, Hastings Street, Vancouver. This office which will be managed by Mr. Harry C. Stephenson, will take care of the B. C. and Alberta territory.

Inauguration of Civic Gazette

The scheme put forward by J. G. Glassco, manager of the Winnipeg Hydro, for the inauguration of a Civic Publicity Bureau in the City of Winnipeg has been adopted by Council. In addition to other forms of publicity work it is proposed to publish a Civic Gazette which will appear as a miniature newspaper of about three columns, printed in the regular daily papers with a special heading. Facts and figures regarding civic life in general will be published from time to time in connection with all the different phases of civic operations. Special attention, however, will be given to the Winnipeg Hydro-electric System, as it is recognized that the citizens should be brought into closest possible touch with this important municipal utility.

Mr. Glassco in making his recommendation to Council stated "We want the citizens of Winnipeg to take a sympathetic and intelligent interest in the affairs of their various utilities and the dissemination of information concerning these utilities is the proper means of maintaining this interest. My efforts will be directed in making the Civic Gazette a budget of snappy, interesting news items which all citizens as well as tax-payers should find easy to digest."

Mr. C. F. Gray Returns to Winnipeg

Mr. Charles F. Gray, consulting electrical engineer, and former Mayor, of Winnipeg, has just returned to that city after a year's absence in England. Mr. Gray is again taking up his professional work having made connections with British Capital that will mean business in the future. While in England Mr. Gray had the distinction of being elected a Fellow of the Royal Geographical Society.

New From Edmonton

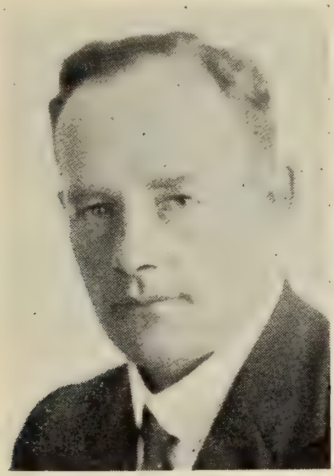
The Carey Electric, electrical engineers and contractors, Edmonton, Alta., have recently been awarded the wiring and lighting fixture contract for the new wing of the Misericordia Hospital, Edmonton; building costing $250,000. Also contract for wiring and lighting fixtures for the Kitchen Building 101st Street, Edmonton, Alta;

Mr. G. Coward, 93rd. Street, Edmonton, Alta., has recently gone into business as an electrical contractor. Mr. Coward was formerly employed for 2½ years with Messrs. B. L. Perry, Ltd., electrical engineers and contractors, having altogether had about 15 years' experience in the electrical trade. Mr. Coward, has seen considerable service overseas, having served with the 63rd and 8th Battalions, enlisting in 1915 and being discharged in 1918.

The Annual Picnic of the Manitoba Electrical Association—

Succeeds Mr. Caton

Born at Bristol, England, in 1886, Mr. J. W. Sanger received his technical education at Faraday House Electrical Training Institution, London, England, from 1903 to 1907. On leaving Faraday House he accepted a position with the Midland Electric Power Company. Staffordshire, England, as district superintendent in charge of sub-stations and all distribution for several towns in a manufacturing centre. He remained with the company until he resigned in 1911 to come to Canada where he joined the engineering staff of the Winnipeg Hydro-electric System, the same year being appointed superintendent of distribution for the system. Toward the end of 1913 Mr. Sanger accepted the position of assistant to the manager of the Winnipeg office of the Siemens Company of Canada Ltd., remaining with this firm until July 1915 when he was made power house superintendent for the City of Winnipeg at the Point du Bois power house, which position he held to the present time. He has just succeeded Mr. E. V. Caton as chief engineer of the Winnipeg Hydro-electric System.



Mr. J. W. Sanger

Represents Hatheway & Knott

Fred E. Garrett, 501, Confederation Life Block, Winnipeg, has been appointed Western Representative for Messrs. Hatheway and Knott, New York, who are Canadian Sales Agents for the following: Killark Electric Co. Manhattan Electric Supply Co.; Steel City Electric Co.; McGill Mfg. Co. (Lamp guards), Heinmann Electric Co. (Radio Supplies). Eugene T. Turney Laboratories. (Radio Apparatus). Mr. Garrett has also been appointed direct representative for Western Canada for the Oshkosh Mfg. Co., pole line construction tools.

A. L. Fisher, Canadian Representative

A. L. Fisher, late sales manager of Stephenson, Russell Ltd., Winnipeg, has opened an office at 290 McDermot Ave., Winnipeg, where he will specialize in radio supplies. Mr. Fisher has just been appointed Canadian representative for the General Radio Company, who are affiliated with Cox-Cavendish Electrical Co. Ltd., of London. Harlesden, Edinburgh,, and Bradford, England.

Appointed Operating Superintendent

Born at Walkerton, Ont., in 1885, Mr. C. A. Clendening received his education at the public and high schools of Walkerton, and his technical training at the Faculty of Applied Science and Engineering, University of Toronto. His first step in a professional career was with the Fensom Elevator Co., of Toronto, where he remained about two years, leaving there to join the Toronto Street Railway Co., which concern he remained with for a short period. The next three summers were taken up with land surveying. In 1908, Mr. Clendening worked under Smith, Kerry, and Chace on the designing and construction of the transmission line connecting Point du Bois with Winnipeg and after spending about three years on this work joined the Canadian Westinghouse Co., on the installation of switching and other electrical apparatus in the Point du Bois power house. In the early part of 1912 he joined the Winnipeg Hydro-electric System, as sales engineer, then as distribution engineer, which latter position he has held up to the present time, with the exception of three and a half years' service overseas. He has just been appointed operating superintendent for the same system.

Mr. C. A. Clendening

Work is starting at once on a power house and laundry for City Hospital, Saskatoon. Estimated cost $37,000.

"Everybody Happy," especially the orphans

Events in the Wireless Field

Wire Mosquito Netting Forms Efficient Aerial

Tests having to do with the substitution of wire netting for the ordinary aerial wire, have proved extremely successful. Two strips of netting from six to fifteen feet long and from 18 to 36 inches wide suspended a few feet above the earth and a few feet apart were used.

Large Capacity

The effect produced relatively large capacity. Strips are spoken of as a condensing antenna. The efficiency was found to be greatly reduced when the strips were hung vertically instead of horizontally.

J. C. Warner, assistant physicist in the bureau of standards radio laboratory, reporting these tests, said:

"Experimental results show that a condenser antenna of small dimensions gives excellent results when used at wave lengths below 400 meters. At longer wave lengths it suffers by comparison with the coil antenna when the dimensions are kept small enough for portability.

Useless Alone for Directional Work

"It is useless for directional work unless used with a coil antenna, but may be used in places where the sharp directional characteristics of the coil are objectionable. By proper design and by taking precautions to keep dielectric losses low the effective resistance may be reduced to a value lower than can be obtained either with the coil antenna or the ordinary elevated antenna.

Low Resistance

"On account of this low resistance and ease of construction this form of antenna should be of great value in portable short-wave radio stations, such as are used for military purposes and on airplanes, although in the latter case some difficulty may be experienced in keeping down dielectric losses.

"It is evident that the study of this interesting form of antenna is by no means complete. Its use as a transmitting antenna offers a wide field for investigation, and a large amount of work remains to be done in following up the investigations which have only been started in this study."

Radio Will Play Part in Detection of Criminals

An indication of the part which radio is soon to play in the detection of fugitive criminals is supplied by an incident which took place in Woodstock, Ont., recently. A local radio enthusiast, while gathering the American baseball results for the day, picked up the description of a criminal wanted in Detroit, as it was broadcast by the chief of police of that city. Within one minute after the particulars were voiced by the Detroit chief they were in the hands of Chief Moore of Woodstock.

Radio Requirements for Ships

The radio service of the United States Department of Commerce and Labor requires that ships carrying 50 or more people plying between ports 200 miles or more apart be equipped with radio apparatus and to be in charge of a person skilled in its use. It also requires an auxiliary source of power, a means of communication between the radio room and the bridge, and two or more persons skilled in the use of the radio apparatus, one or the other of whom shall be on duty at all times while the vessel is being navigated. The enforcement of this law is under the immediate supervision of the Bureau of Navigation and is accomplished through radio inspectors assigned to the principal seaports on the Atlantic and Pacific Ocean, Gulf of Mexico, and the Great Lakes. They are required, as far as possible, to inspect the radio equipment before each sailing of a vessel which is subject to the act, to determine if the apparatus is efficient and affords proper protection to the passengers and crew.

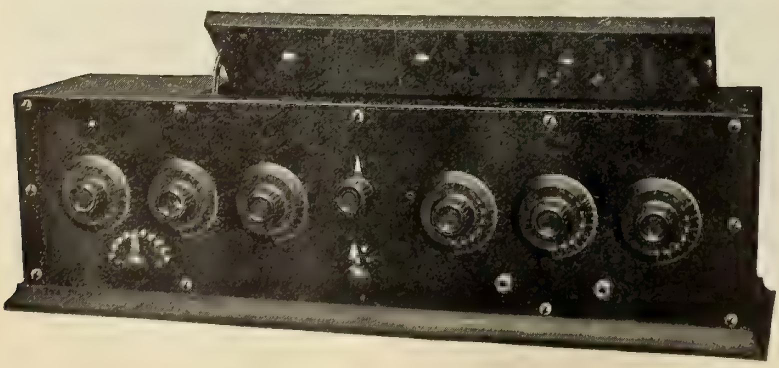
Wireless Station for University of New Brunswick

A radio station at the University of New Brunswick, has been established as a result of the gifts of apparatus donated to the Electrical Engineering Department by F. P. Vaughan, M. Sc., of St. John. Professor A. F. Baird, head of the Physics and Electrical Engineering Departments at U.N.B., has spent a considerable portion of the vacation period in experimental work with the apparatus, and has succeeded in establishing an amateur station which has been heard by local amateurs, and which is expected to have a sending radius of approximately 150 miles when perfected.

Recently Professor Baird received the required license for which he had applied to the Navy Department at Ottawa. The license subject to the customary restrictions placed on amateur stations so as to prevent interference with established commercial stations, allows the operation of the station at the University at any time. The station has been registered under the call letters of IDO.

So far very little has been done in connection with the receiving portion of the set but signals from Arlington, Va., have been heard faintly. The complete set will be used in connection with the electrical instruction given this year at the University and will be available for research work along wireless and high frequency lines.

A feature of a forthcoming London, England, revue is to be a wireless number, in which genuine Marconi apparatus will form part of the stage "props."



A popular Gilbert Menzies Receiving Set—Two stages of radio frequency and one stage of audio frequency amplification render possible the use of indoor aerials or loop antenna, signals have been heard from 1000 miles.

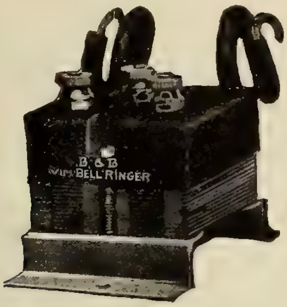
The Latest Developments in Electrical Equipment

Side Outlet Plug

A new side outlet plug has been placed on the market by the Anylite Electric Company of Ft. Wayne, Ind. It is designated as the "Anylite TP-2." Its construction is similar to that of the "Anylite" twin plug, the cover being of cold molded insulation and the legs of hard vulcanized fibre. The lower leg is threaded for a "Uno" shade holder so that the lamp and shade are held in correct relative position, the tap for appliances being made above the shade.

"Vim" Bell Transformer

The Betts & Betts Corporation, 645 West Forty-Third Street, New York City have recently brought out a bell transformer of the exposed core type. The primary and secondary terminals are brought out to a single block. The coil is small so as to reduce the copper cost, and yet have sufficient turns to keep the magnetizing current within limits. The cores have been given as much steel as possible without registering a core loss on the meter, and consist of stampings of sheet steel. Upon assembly, the coil and core are impregnated with an insulating varnish and the moisture is eliminated by a baking process.

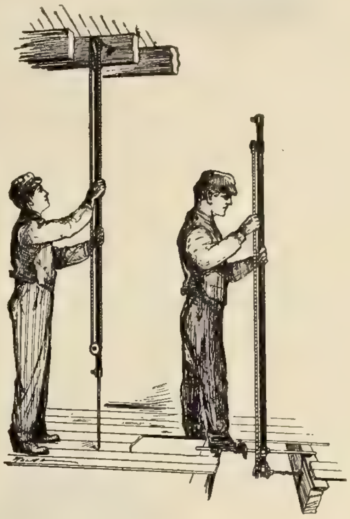


Moulded Tube Socket

The Kellogg Switchboard & Supply Company, Adams & Aberdeen Sts., Chicago. Ill., are marketing a molded tube socket for all standard four-prong-based vacuum tubes. Construction includes four German-silver springs held in position in deep grooves and prevented from making contact with the mounting surface. Nickel-plated binding posts are clearly marked for wiring. The wiring can be secured under the socket as well as the top binding post. The socket is 2 3/16 in. square with round corners and has a total depth of 1¼ in.

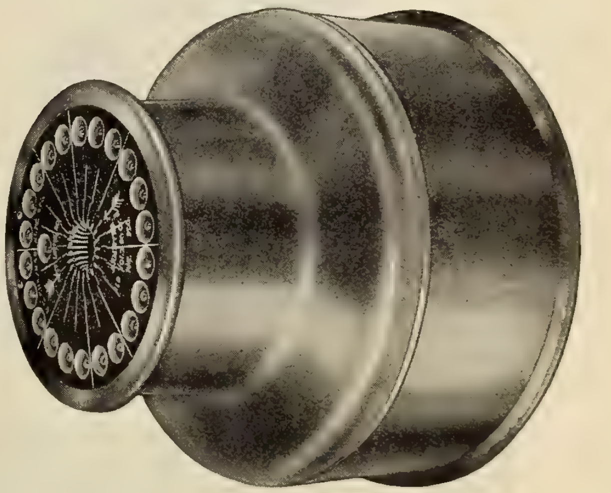
Chain Drive Boring Machine

The Dominion Electric Supply Company, Limited, 110 Queen St. W., Toronto, are marketing a chain boring machine with several distinctive features. The cut shows the method of operation for overhead and below-the-floor work. The manufacturers claim that more holes can be bored in an hour in this way than can be bored in a day by ordinary methods. Distributors are wanted for this machine.



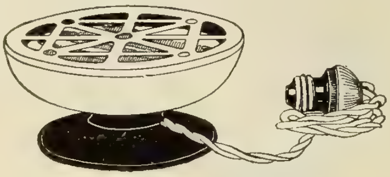
"Armeter" Testing Device

A new armature testing device has been placed on the market by the P. E. Chapman Electrical Works, Tenth and Walnut Streets, St. Louis, Mo. This is claimed to eliminate the step-by-step method, the test being made in one operation. In testing an armature the commutator is slipped into the circle of contact fingers located in the centre of the instrument. Individual lamps which are used as indicators are inserted in each section and 110-volt, 60-cycle alternating current is supplied. From the brilliance of the lamp the type of defects and their locations can be determined. A ground detector indicates grounds while a pilot lamp is used to show the brilliance that should be obtained in testing a coil with no defects. The instrument is marketed as a production instrument and is not adjustable to different sizes of armatures.



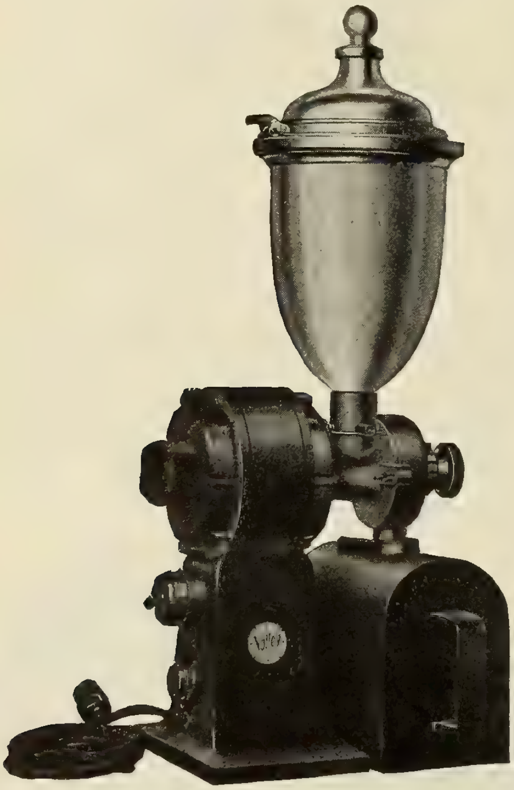
Hot Plate

The Betsy Ross Hot Plate has been recently placed on the market by the Central Flatiron Manufacturing Company, 200 Fifth Ave., New York. Its construction embodies a polished aluminum bowl and mahogany base, and removable top, enabling the element to be cleaned. The heating element is of Silchrome and is guaranteed for one year. A circular issued by the company describes its use as coffee urn heater, toaster, etc.



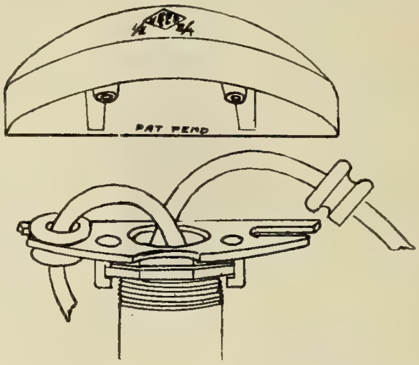
Electric Coffee Mill

An electric coffee mill has been placed on the market by the Valley Electric Company, St. Louis, Mo. The mill is equipped with a ¼ h.p. Valley Electric Motor, and is especially designed for groceries and delicatessen stores. Decorative features have not been neglected, hopper being of aluminum, and base painted red with black stripes. Hopper and can will hold 5 lb. On medium grinds the manufacturer claims a capacity of a pound of coffee a minute.



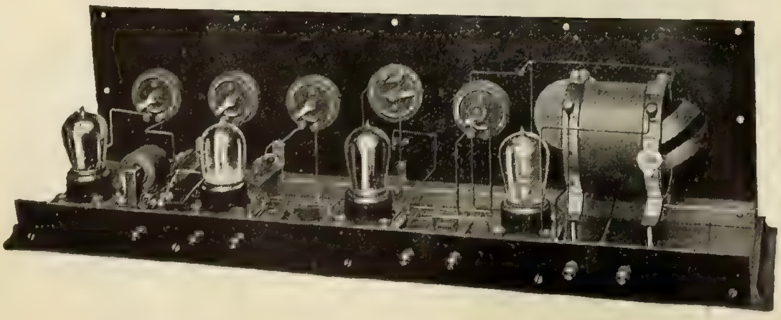
"Duo" Aluminum Hood

A two-piece aluminum wiring device consisting of a plate and a hood has recently been placed on the market by the Veco Manufacturing Company, 5 Quincy St., South Norwalk, Conn. Porcelain bushings are accommodated by three slots in the plate and the arrangement is such that bushings may be put in place after wires have been drawn through the conduit. The bushings are slipped over the conductors and the conductors then bent downward allowing bushings to rest in recesses in plate. The device is made in several sizes up to 6 in., each size fitting two separate sizes of conduit. When using the smaller conduit, a lock nut and bushing hold the conduit firmly against the plate. When it is desired to use a larger conduit, two supporting lugs on the bottom of the plate hold the larger lock nut and the conduits is screwed up to the plate. The hole for the smaller conduit thus acts as a bushing for the larger size.



Cream Whipping Machine

A useful household device, which whips cream, beats eggs and does similar work formerly done by hand, is being marketed by the Racine Universal Motor Company, 4642 Ravenswood Avenue, Chicago, Ill. It is built in different sizes to meet the needs of large and small families, coming in 3, 6, and 9-pint sizes. The manufacturers expect the larger sizes to be called for more by soda fountains, etc., the smaller being especially popular, for household use. Equipped with universal motor operating from a lighting socket.



Radio Frequency Set

The A. C. Gilbert-Menzies Co., 439 King St. W., Toronto, are marketing a radio frequency set of improved design. It is claimed that this set has an advantage in that the signals are not distorted due to non-regeneration. The outfit consists of two stages of radio frequency amplification, a detector, and one stage of audio frequency amplification. The audio amplifier is practically unnecessary except when loud speaker is attached.

Current News and Notes

Almonte, Ont.

The Bell Telephone Company is installing two new switch boards here. Mr. J. J. Gardiner, district manager, stated that a new overland cable is also in course of installation.

Ayr, Ont.

Accidentally coming in contact with a high tension wire while making some repairs to the hydro-electric system in Ayr recently, John Little, electrician, was instantly killed. At an inquest following the accident, the jury brought in a verdict of accidental death. and added a recommendation that the key for the lock on the emergency switch at the transformer station be kept in a suitable place outside the building so that there would be no delay in cutting off the power should it be necessary.

Calgary, Alta.

The Cunningham Electric Company of Calgary, Mr. G. M. Wilkinson, manager, recently sold 56 vacuum cleaners in two weeks. This was largely the result of an intensive house-to-house campaign carried out by two of Mr. Wilkinson's salesmen.

Fernie, B. C.

The East Kootenay Power Company are duplicating their transmission line. This involves a second line from Bull River to Coleman. and from Bull River to Kimberley. The addition is made necessary by the demand from mining companies in the vicinity.

Galt, Ont.

An electrical cooking demonstration was recently given by Miss M. E. Henderson and Mrs. M. J. Sheppard, of the Canadian Westinghouse Company, in the Hydro shop.

Georgetown, Ont.

A by-law was recently carried to loan Smith and Stone $40,000 to enlarge their present electrical supply manufacturing plant.

Hamilton, Ont.

Street railway receipts for the second quarter of the year fell below the expectations of city officials, according to figures received by W. H. Davis, city treasurer. The city's eight per cent of earnings for three months ending June 30, amounted to $20,005.28, as compared with $20,292.86 for the same period in 1921. It is stated that bus lines are partly to blame.

Discussion on Hydro power rates featured at a recent Board of Control meeting and a committee will meet the Hydro Commission to further discuss the proposed changes. Mayor Coppley remarked that the house holders were not being asked to pay any increase and the jump of $4 per horse-power was a burden which the commercial interests had to shoulder.

Ground has been broken at the new quarters for the Hydro at 12 King street east. Commissioner Ellis announced recently. The alterations and additions to the building will be rushed to completion, and it is expected that the department will be located in its new home by December 1.

Kitchener, Ont.

At a recent meeting of the Light Commission, Superintendent McIntyre reported that the peak load for July amounted to 7,304 h.p. Last year the peak amounted to 6,099 h.p. There have been recently added 60 new residential consumers, 6 new commercial consumers and 6 new power consumers of a total of 176 H.P.

London, Ont.

That the time is now ripe for the city council to take action to clear the streets of the downtown districts of all overhead wires is the opinion expressed recently by E. V. Buchanan, manager of the Public Utilities Commission. The Public Utilities will begin removing hydro wires from Dundas and Richmond streets, between Ridout and Wellington streets and the G.T.R. and Fullarton streets. The district will then be supplied with light and power by underground cables. With the hydro wires out of the way Mr. Buchanan believes the council will obtain results if they ask the telegraph companies to remove their mesh of wires from the main thoroughfares. He stated that the companies had expressed willingness to take action as soon as the city had removed the power wires.

Montreal, Quebec.

The third annual Canadian Telephone convention was recently held in Montreal. Mr. W. H. Winter, of Montreal, was chairman. Addresses were given by representatives of Canadian systems and various lunches, dinners and demonstrations completed an interesting programme.

The net earnings of the Southern Canada Power Company for the ten months ending July 31st., 1922, are shown to be $391,838, an increase of $88,389 over the earnings made in the ten months ending July 31st, 1921.

North Portal, Sask.

At a meeting of citizens of Portal and North Portal to consider the electric light proposition, committees were appointed to report on the terms the old company had to offer and to interview the Kenmare Co. regarding the extension of their wires from Bowbells north to Portal. At this meeting it was found that the Taylorton, Sask., mines, were not in a position to furnish light to the border towns. Geo. Fordyce reported that the Kenmare Co. were desirous of linking up their lines with Portal and North Portal via Bowbells, which is now supplied by this company, and were also anxious to extend their business to Flaxton en route and also to Lignite, Noonan, and Columbus, making the coal mines near Columbus the power centre.

Ottawa, Ont.

It is reported that the Hull Electric Company has acquired the riparian rights of Paugan Falls, on the Gatineau River and will in the course of the next year, establish a hydro power plant with an ultimate capacity of 150,000 horse-power. About two years will be required for the completion of the work.

E. McG. Quirk, of Montreal, has been chosen chairman of the board of conciliation appointed to inquire into the dispute between the Marconi Wireless Telegraph Company and its employees, some 300 men being directly affected, and from 100 to 200 indirectly. The employees are represented on the board by Thomas Taylor, of Toronto, and the company by Melville P. White, also of Toronto.

Port Arthur, Ont.

A new schedule of the Fort William street railway for through traffic has been prepared and came into effect on Friday, September 1st, when one-man cars were placed on the run between the cities. The schedule provides for a thirteen minute service.

Quebec, Que.

In a recent address before the directors of the Quebec Exhibition, Mr. E. A. Robert spoke as follows:

"We have in the province power resources untapped greater than can be used locally by the generations that will succeed us and it seems that the sanest policy for us to follow would be to develop these resources, use all we can locally and turn into cash to help us in developing in the province a portion of the power resources that will never be utilized otherwise."

It is reported that both the passenger traffic and freight earnings of the Quebec Railway, Light, Heat & Power Company show considerable increases as compared with the corresponding period last year. and due to the heavy tourist trade the parlor tourist train operating between Quebec and Ste Anne de Beaupre is showing very satisfactory results. Mr. W. J. Lynch, General Manager, reports that the ten new double truck cars, recently obtained, are improving traffic conditions in the city.

St. John, N. B.

The City Council met recently with Dr. J. B. M. Baxter, K.C., city solicitor, and discussed the terms of the proposed contract between the city of St. John and the New Brunswick Electric Power Commission for the delivery of ten to fifteen million kilowatt hours of electrical energy from the commission's development at Musquash. After the discussion, on the advice of the solicitor, it was decided that the council would meet again to determine what policy they would adopt as to the distribution of the current, and then the solicitor would meet with the power commission to attempt to straighten away some objections to the proposed contract.

St. Thomas, Ont.

Following a deficit of $525.71 for the month of August, it was decided to raise the St. Thomas Street Railway fares to 7 cents.

Saskatoon, Sask.

The contract has been awarded to Eugene F. Phillips Electrical Works. Ltd., for approximately 7,000 feet of armored cable and certain other material required for the extension to the electrical light distribution system of Saskatoon, Sask.

Sandwich, Ont.

Sandwich town council has agreed to grant permission to the Hydro-electric Commission to construct a spur line from Sandwich street, Sandwich, to Cadwell's sand and gravel dock upon certain conditions which are to be forwarded the Commission for approval.

Scarboro Township, Ont.

Scarboro Township Council is conferring with the Hydro-electric Power Commission of Ontario regarding the cost of Scarboro operating a bus service as a public utility on Danforth road, from the city of Toronto limits to Scarboro Junction. The road is in excellent shape, Scarboro has Hydro power, and only erection of the poles and wires is necessary. The service would be patronized by Oakbridge, Kennedy Heights, Birch Cliff Heights and Scarboro Junction citizens, many of whom work in Toronto.

Toronto, Ont.

In a recent notice issued to the bondholders of the Toronto Railway Company, it was stated that six months interest on this Company's bonds was payable on the 31st day of August, 1922. at the rate of 6% per annum, in accordance with the decision of the Directors of the Company..

The company further states that the arbitration with the city of Toronto to fix the price for the railway company's street railway property taken over by the city, has now reached the stage where only the argument of council remains, all evidence having been put in. The Arbitration Board will reconvene to hear argument on the 19th of September.

Warkworth, Ont.

An agreement has been reached with James A. Goodrich proprietor of the privately owned electric plant of that village whereby the village is to pay Mr. Goodrich $4,000 for his franchise, which has between four and five years to run. The private interest will be taken over in the event that the Hydro by-law is passed, when it is put to a vote.

Welland, Ont.

The Welland Electrical Co. suffered a loss recently when someone threw a wire over their line at the corner of South Main and Fourth street. This made a short circuit which burned out a switch. The company is of opinion the deed was done maliciously for the wire was hooked to the line so that it could not fall off.

Winnipeg, Man.

The Eureka Vacuum Cleaner Company, Mr. V. R. Homersham, manager, recently moved from 408 Notre Dame Avenue, Winnipeg, to new quarters at 610 Portage Avenue. Mr. Homersham reports that his firm has placed large number of appliances in Winnipeg homes as the result of intensive operations.

Wiring Contracts Awarded

Barrie, Ont.

F. Carpenter $3,500 res., 183 Bradford Street East.

Bordeaux, Que.

J. A. St. Amour, 2171 St. Denis St., Mtl., $141,500 school.

Carleton Place, Ont.

F. A. Wilson, Ridgemont St. Ottawa, high school.

Charlottetown, P. E. I.

Palmer-Watson Electrical Co., 256 Queen St., add. to school on Prince Street.

Walter M. Walker. 21 Prince St., $5,000 res., School St.; $3,500 bungalow, Orlebar Street.

Cochrane, Ont.

J. Reed & Son, $3,500 res.; $5,000 res., 3rd St. & 7th Ave.; $3,500 res., 3rd St.; $3,500 res., 8th Ave.; $3,500 res., 11th Street.

Coniston, Ont.

Mr. Cunningham, $10,000 rectory, Nipissing Dist.

Downie Twp., Ont.

W. Gaul, Charles Street, Stratford, $3,500 res., 3rd concession.

Edmonton, Alta.

Carey Elec. & General Repairs, 9989 Jasper Ave., on Misericordia Hospital.

Hillas Elec. Co., B. L. Perry, H. W. Depew, Edmonton, $150,000 isolation hospital.

Galt, Ont.

Galt Elec. Gas Fixture Co., $19,000 railway stn., Main St.

Humber Bay, Ont.

Northern Foundry & Machinery Co., 152 Bay Street, Toronto, $3,500 pumping station, Church & Queen Streets.

Leaside, Ont.

Cdn. Comstock Co., Ltd., 10 Cathcart St., Montreal, $750,000 add. to auto plant.

Kentville, N. S.

Ken. S. Cook, $6,000 res., Main Street.

Kingston, Ont.

H. W. Newman & Co., 167 Princess St., on isolation hospital.

Kitchener, Ont.

J. Schweitzer, Waterloo, $5,800 res., Troy Street.

Otto Reiber, Waterloo, $4,300 res., Wilmot St.; $4,000 res., Louisa Street.

Mattell & Bierwagen, Cor. King & Young Sts., $35,000

Convention of Contractors and Dealers in Toronto, November 13 and 14

add. factory, South St.; $4,500 res., Wilmot Street.

Star Electric Co., King St. West, $25,000 res., Queen Street North.

London, Ont.

A. C. Bryce, 393 Grey St., $5,000 res., King Street.

Maxville, Ont.

R. J. Desjardin, $3,500 res.; $1,500 show room, Fair St.

Mimico, Ont.

Warner & Fordyce, $4,500 res., Primrose Ave.; $3,500 res., Robert Street.

Moncton, N. B.

Duffy & McCarthy, Lutz St., $5,500 res., Highfield & Union Sts.

Edgar Le Blanc, Church St., $5 000 res., Church St.; $5,400 res., High Street.

Montreal, Que.

A. L. Allard, 162 Mt. Royal E., $8,000 res., 499 Melrose Ave.

J. A. St. Amour, 2171 St. Denis St., $180,000 school & res., Boyer Street.

J. A. Anderson & Co., 205 Mansfield St., $500,000 council bldg., 255 Mountain Street.

Bergeron Electrical Works, 1074 Berri St., $12,000 res. & garage, St. Denis.

J. Bleau, Visitation St., $15,000 three flats, Sherbrooke St.

W. E. Booth, 34 Bottrel Ave., $75,000 five pr. semi-det. res., Hampton Ave.

H. A. Byron, 266 Durocher St., $8,000 gas station, Blvd ine Street West.

H. A. Bryon, 266 Durocher St., $8,000 gas station, Blvd. Decaire.

J. A. Champagne, 2599 St. Hubert St., $12,000, three flats, St. Valier Street.

A. De Repentigny, 615 Mt. Royal E., $12,000 res., Chabot Street.

E. Demers, 757 De Gaspe St., $7,000 cottage, Blvd. Pie IX.

J. Goldberg, 1091 St. Dominique St., $13,000 five flats, Henri Julien.; $10,000 synagogue, Bagg & Clarke Streets.

G. Houle, 200 Boyer St., $22,000, two res., Vendome Ave.; $16,000, two res., Victoria Ave.

Mt. Royal, Que.

H. P. Cassidy, 255 Regent St., Mtl., $7,000 to $8,000 each 52 res., Vivian, Wicksteed & Dobie Streets.

Niagara Falls, Ont.

Upper Electric Co., Ferry St., $5,000 each two stores & apts., Main Street.

Oakville, Ont.

B. E. Sprowl, $6,500 res., William Street.

B. F. Sullivan, $6,500 res., Spruce Street.

Oshawa, Ont.

Harris & Marson, 81a Parkway Ave., Toronto, $100,000 church, Centre Street.

Ottawa, Ont.

Mr. Bartlett, $5,000 res., Renfrew Avenue.

Dalhousie Electric Co., Dalhousie St., $4,000 res., Longevin Avenue.

J. A. L. Ellicott, Bank & Strathcona Ave., $10,000 three res., Aylmer Ave.; $4,500 res., Clarey Ave.

Garrioch & Goddard, Elgin St., $7,000 res., Ossington Ave.

E. Headly, 645 Echo Dr., $6,000 each res., Driveway; $9,000 two res., Windsor Ave.

W. Hoffman, Westboro, $5,000 res., Sunnyside; $4,500 res., Belmont Ave.

T. E. Hopson, 134 Bank St., $12,000 mission bldg., Slater St.; $7,000 altn. church & add. hall, Sparks Street.

Stan. Lewis, 63 Metcalfe St., $10,000 two res., Clarence street; $4,500 add. res., Gloucester & O'Connor Sts.; $5,000 res., Ivy Street.

E. G. Tressider, 58 5th Ave., $4,500 res., Roseberry Ave.

N. Young, $5,000 res., Ross Avenue.

Outremont, Que.

C. Page, 3246 Drolet St., $16,000 res., Hartland Avenue.

J. W. Tousignant, 637 Marie Anne E., add. scolasticat on 1983 Rachel Street East.

Regina, Sask.

Lorne Elec. Co., 1820 Smith St., $4,000 res., Elphinstone Street.

St. Catharines, Ont.

A. B. Cudney, 22 Thomas St., $3,500 res., 11 Taylor Ave.

Dunnell & Eckert, Sherwood Ave., $3,500 bldg., Haig St.

H. C. Holmes, 30 Ann St., $2,500 res., Wiley & Linden Streets.

St. Pierre Aux Liens, Que.

Vallee & Hamelin, 1867 St. James St. W. Mtl., $121,000 school, St. Pierre Aux Liens.

Sandwich, Ont.

Aitch & Co., Amherstburg, Ont., $7,500 res., Askin Blvd.

Sault Ste. Marie, Ont.

Rapid Electric, 725 Queen E., $3,000 res., Coulson Ave.

Penfold & McBride, 76 Pim St., $4,000 res., The Drive.

Taylor Bros., Gore St., $9,000 stores, North & Wellington Streets; $20,000 add. mission, Albert Street West.

Stratford, Ont.

Cook & O'Donoghus, Downie St., $5,000 res., Romeo St.

Toronto, Ont.

Canada Electric Co., 175 King St. East, $20,000 add. school, Malvern Collegiate. Contract price $537.; $90,000 office bldg., Bay St.; $600,000 office bldg., Richmond & Sheppard Sts.

Cavers & Harvie, 702 Brock Ave., on res. Killarney Ave.

Blagdon Electric, 2240 Queen E., $10,000 res. & garage, 12 St. Andrews Gardens.

Trenton, Ont.

Charles Bowra, 52 Simcoe St. N., $200,000 woll combing & washing plant.

Tweed, Ont.

Electric Installation Co., 279 Front St., Belleville, on alt. school.

Verdun, Que.

E. Demers, 460 Beaudry St., $10,000 flats, Galt Avenue.

E. Robillard, 255 Hamilton St., on three flats, 2nd Ave.; $12,000 two res., 2nd Ave.

W. Quesnel, Church Ave., $6,300 three flats, St. Joseph Street.

J. Quisnel, Church Ave., $6,300 flats, St. Joseph Street.

Wm. Rochon, 454 Lafontaine Park, $93,000 add. school & res. Treherne Ave.

Victoria, B. C.

Murphy Elec. Co., 603 Sayward Bldg., Vic., $3,500 res., Macauley Plains, Esquimalt.

Westmount, Que.

Sayer Electric Co., 87 Bleury St., $23,000 res., 17 MacGregor Street.

Windsor, Ont.

A. Cook, $6,000 each ten res., Church Street.

W. A. Lefave, 1231 Erie St., $8,000 res., Victoria Ave.; $22,000 church, 609 Dougal Avenue.

McKay McNaughton Electric Co., 115 Sandwich St. W., $15,000 stores and apts., Erie & Victoria Streets.

Winnipeg, Man.

Levvy Elec. Co., Ltd., 493 Portage Ave., on stores Portage Ave.; $20,000 seven stores, Garry & Ellice.

York Twp., Ont.

Patterson Electric Co., 43 Fermanagh Ave., $30,000 add. school, Humbercrest School.

Radio Broadcasting in Great Britain

"Great Britain will solve the interference problem in radiophone broadcasting by government control and regulation", according to A. P. M. Fleming, C. B. E., Manager of the research and educational department of the Metropolitan-Vickers Electrical Company, Manchester, England. Mr. Fleming represented England at the international convention of the Institute of Electrical Engineers and the International Electro-Technical commission at Niagara Falls.

"One of the things we have learned is to avoid the establishment of innumerable radio stations, with no plan of co-operation between them. Eight 1 1/2 kw. stations are contemplated and some of these will probably be built this year. These stations will be located in the principal cities throughout the British Isles and will be operated so as to eliminate the chaos usually found where no rules are in force.

"We have no such thing as broadcasting in Britain at present in the sense in which the term is used in America." he said. Government restrictions have prevented it, on account of the possible interference with the requirements of the navy, mercantile, marine, war services and aeroplane traffic. But the largest manufacturers of radio apparatus have co-operated with the British Government officials in working out plans for the proper control of broadcasting.

"The broadcasting stations will be operated on strictly regulated wave lengths and other set rules, which will be published for the guidance of radio receiver owners. Every radio set owner will be required to pay an annual tax, also, and there will doubtless be special restrictions applying in times of national emergency.

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15 h.p.,	3 ph.,	25 cyl.,	550 volts,	750 r.p.m.
15 h.p.,	3 ph.,	60 cyl.,	220 volts,	1200 r.p.m.
13 h.p.,	3 ph.,	25 cyl.,	550 volts,	700 r.p.m.
10 h.p.,	3 ph.,	66 cyl.,	220 volts,	1333 r.p.m.
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3 h.p.,	3 ph.,	60 cyl.,	550 volts,	1750 r.pm.
3 h.p.,	3 ph.,	60 cyl.,	550 volts	1120 r.p.m.
3 h.p.,	3 ph.,	25 cyl.,	550 volts,	1500 r.p.m.
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2 h.p.,	3 ph.,	25 cyl.,	550 volts,	1400 r.p.m.
1 h.p.,	3 ph.,	25 cyl.,	550 volts,	1500 r.p.m.
1 h.p.,	3 ph.,	25 cyl.,	110 volts,	1420 r.p.m.
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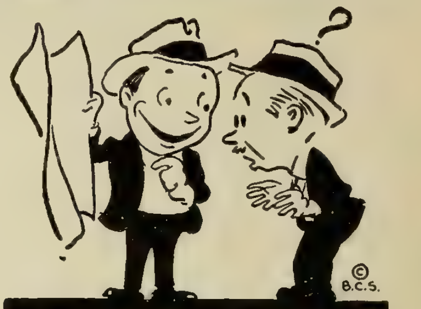

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Baudot Printing Telegraph System, by H. W. Pendry. Published in 1918 by Whittaker & Company. 144 pages, illustrated. Price $1.50.

Direct-Acting Steam Pumps, by Frank F. Nickel.. Published in 1915 by McGraw-Hill Book Company. 258 pages, illustrated. Price $2.00

Direct Current Machinery, Theory and Operation of, by Cyril M. Jansky, B.S., B.A., 1st edition, published in 1917 by McGraw-Hill Co., Inc. 285 pages, illustrated. Price $2.00.

Electric Railway, by A. Morris Buck, M.E. Published in 1915 by McGraw-Hill Book Company, Inc. 390 pages, illustrated. Price $2.50.

"Engineering Electricity," by Ralph G. Hudson, S.B., 190 pages illustrated. Published in 1920 by the John Wiley & Sons, Incorporated. Price $2.00.

Handbook of Machine Shop Electricity, by C. E. Clewell. Published in 1916 by McGraw-Hill Book Company. 461 pages, illustrated. Price $2.50.

"How to Sell Electrical Labor-Saving Appliances," by Electrical Merchandising, first edition, 115 pages, illustrated. Published in 1918 by McGraw-Hill Book Company, Inc. Price $1.00

Practical Electric Illumination, by Terrell Croft. First edition, published in 1917 by the McGraw-Hill Book Co. 225 pages, illustrated. Price $1.50.

"Practical Electrical Engineering,"—Direct Currents. A manual for use in industrial and evening schools and for home study, by Harry G. Cisin. Just published by D. Van Nostrand Company. 324 pages, 68 illustrations. Price $2.00.

"Practical Electricity For Beginners," by George A. Willoughby recently published by Manual Arts Press. 104 pages, illustrated. Price $1.00.

Principles of Alternating Current Machinery, by Ralph R. Lawrence. Published in 1916 by McGraw-Hill Book Company. 614 pages, illustrated. Price $3.50.

Principles of Electrical Design—D.C. and A.C. Generators, by Alfred Still. Published in 1916 by McGraw-Hill Book Co. 365 pages, illustrated. Price $2.00.

"Radio Phone Receiving." A practical book for everybody. Written by nine specialists. Recently published by D. Van Nostrand Company, 179 pages. Price $1.50.

Radiodynamics—The Wireless Control of Torpedoes and Other Mechanisms, by B. F. Miessner. Published in 1916 by D. Van Nostrand Company. 206 pages, 112 illustrations. Price. $1.50.

"Standard Wiring For Electric Light And Power", by H. C. Cushing, Jr. Twenty-Sixth edition, published in 1920. Reduced price, $2.25.

Telegraph Practice, a Study of Comparative Method, by John Lee, M.A. Published in 1917 by Longmans-Greene & Co. 102 pages. Price 75c.

Telegraphy—A Detailed Exposition of the Telegraph System of the British Post Office, by T. E. Herbert, A.M. Inst. E.E. Third edition. Published in 1916 by Whittaker & Company. 985 pages, 630 illustrations. Price $1.50.

"Theory and Calculation of Transient Electric Phenomena and Oscillations," by Charles Proteus Steinmetz. Third edition, revised and enlarged. Published in 1920 by McGraw-Hill Book Co., Incorporated. 696 pages, illustrated. Price $6.00.

"Testing of Electrical Machinery," for non-electrical students, by J. H. Morecroft. Fourth edition, revised and enlarged. Published by D. Van Nostrand Company, 1921. 220 pages, 111 illustrations. Price $3.00.

The Dynamo (2 volume), by Hawkins & Wallis. Published in 1909 by Whittaker & Company. Price $3.00.

The School of Practical Electricity (Electrician's Course in 2 volumes. Volume 1. Published by Electroforce Publishing Company, Milwaukee, Wis. 410 pages, illustrated. Price- $3.00

The Practical Railway Spiral, by L. C. Jordan, C.E. Published in 1913 by Van Nostrand Company. 155 pages. Price 50c.

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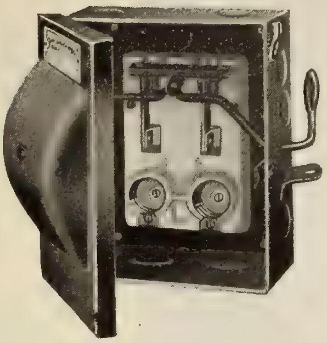
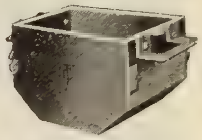
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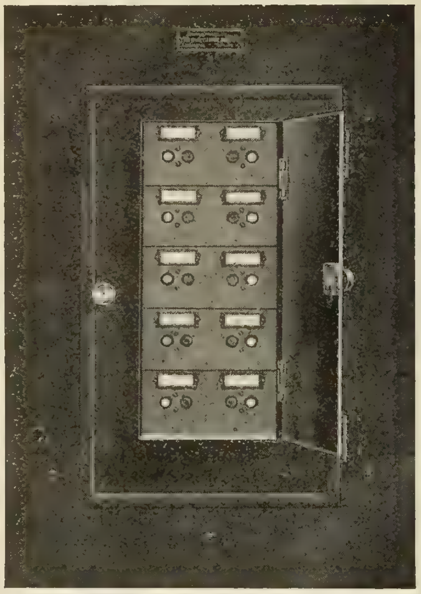

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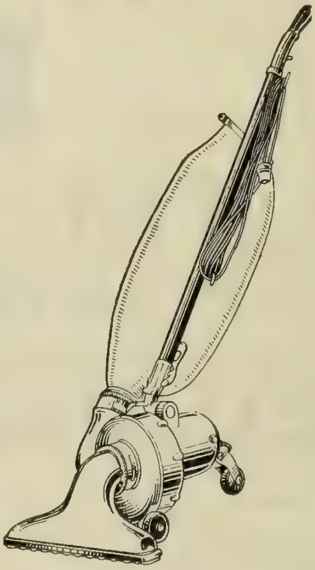

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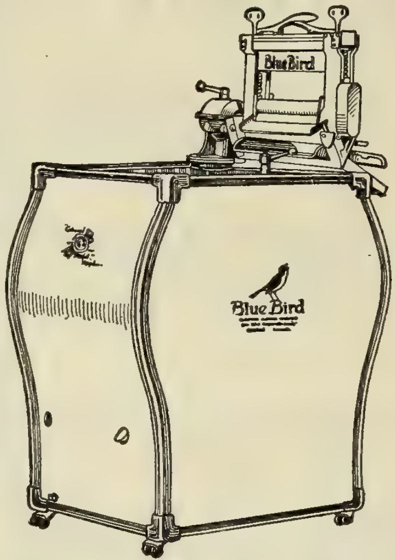

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TO THE TRADE

Gentlemen:

As some of the jobbers and contractors still have small quantities of the 5½ old code split knobs in stock, which they were unable to dispose of (within the time limit) September 1, 1922, we have deemed it advisable to advance this date from September 1 to November 1, 1922. After that date, only approved new code knobs, that are built to conform with the specifications for porcelain insulating devices, as issued by the Approval Laboratory, under date of May 7, 1921, will be accepted.

We also take this opportunity of advising that switch and receptacle plates of substandard thicknesses (.025 and .032 inches) will not be accepted after November 1, 1922. Approved switch and receptacle plates of at least 0.040 inches in thickness will be required.

Kindly arrange to dispose of your present stocks of substandard knobs, switch and receptacle plates by the foregoing date, as we feel that ample notice has already been given the Trade regarding these matters, and would refer you to Approval Laboratory Bulletin No. 18, May 7th, 1921, (revised March 1st, 1922,) and Bulletin No. 10 of June 11th, 1920, October 29th, 1920 and August 26th, 1921, copies of which may be had by application to Mr. W. P. Dobson, Laboratory Engineer, 8 Strachan Avenue, Toronto.

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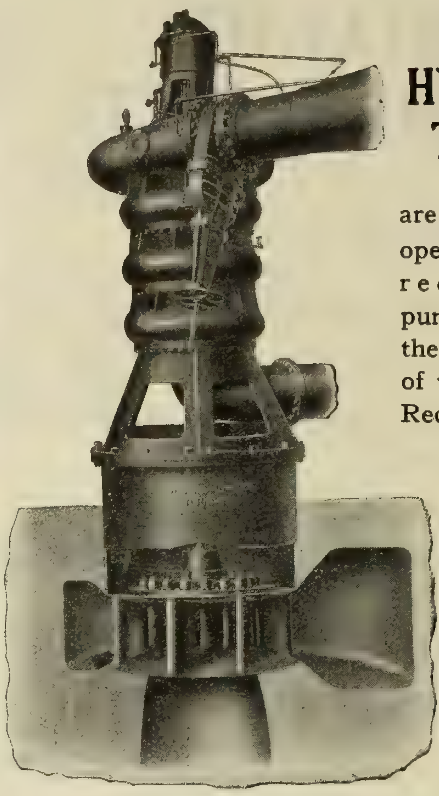

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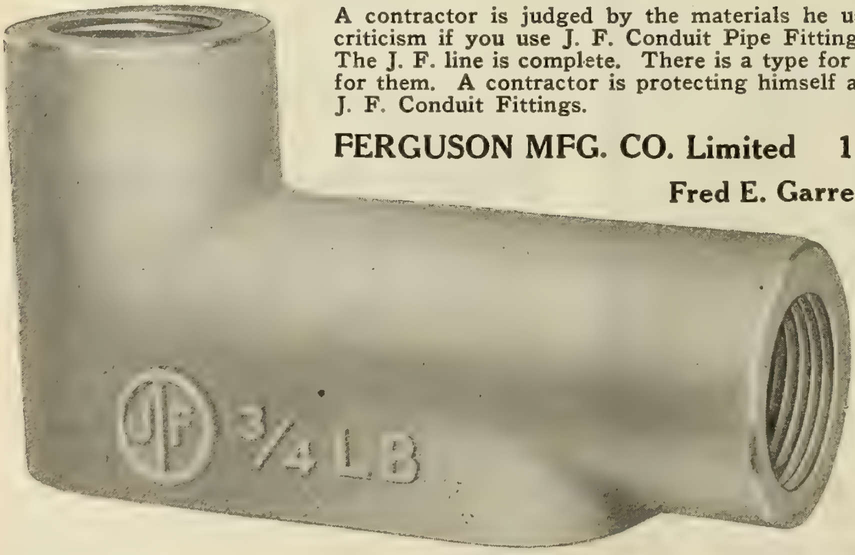

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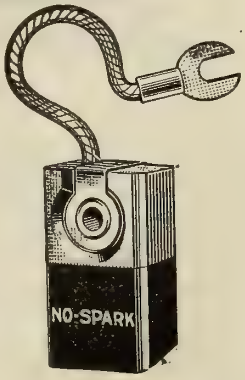

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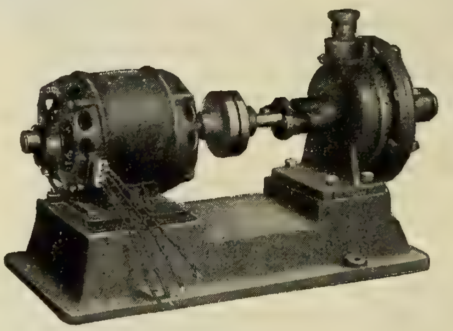

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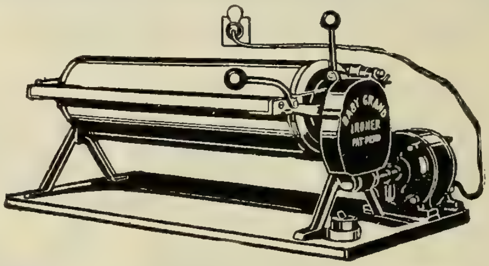

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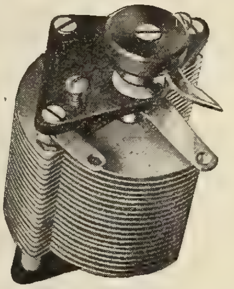

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Winter will witness a tremendous boom in radio. The merchant and manufacturer who anticipates this and prepares accordingly will tap a wonderfully rich field.

For your insulator needs we recommend the one here illustrated. It will stand any test and deliveries can be made immediately from stock.

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Are Your Lamps Imprisoned ?

THE LOXON INVENTION

prevents loss by theft or breakage.

Get our list describing the Loxon Lamp Guards, and giving prices and particulars of this and many other Electrical Specialties.

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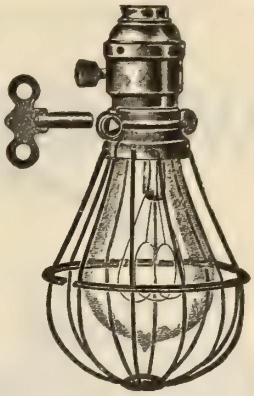
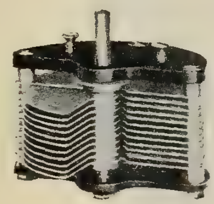


"United" Radio Products

"UNITED"
VARIABLE CONDENSERS



Prices

43	plate	$4.50
23	"	4.00
11	"	3.50
5	"	2.75
3	"	2.25

without dial or knob

In every field there is a standard by which everything else is compared. The fact that "United" Variable Condensers have been accepted as the standard is sufficient in itself to warrant your not buying any other until you have made a comparison.

'UNITED" AUDIO FREQUENCY TRANSFORMERS

Two finishes Black Enamel
or
Buffed Nickel Plated
$4.50.

Radio dealers will find in the "United" Transformer the same high grade workmanship and engineering skill which have made the "United" Condensers the standard in the variable condenser field.

Write for discounts

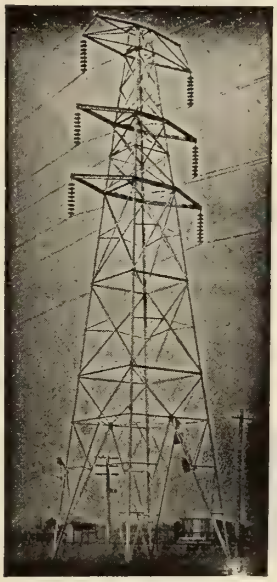
NOTE

Any advertised claim of having an arrangement with us to sell our products at special prices, is fraudulent.

Mounting made easy by our template for locating panel holes; packed free with each condenser.

United Mfg. and Distributing Co.
536 Lake Shore Drive, Chicago, Ill.

GALVANIZED STEEL
TOWERS AND POLES



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The modern means of supporting overhead wires.

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We shall be pleased to furnish designs and estimates upon request.

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Structural Steel of all Kinds
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There are 8 different Models of Fare Boxes, which cover the fare collection field from the smallest to the largest car, accommodating any rate of cash fare, and any kind of ticket.

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PRESTON ONTARIO

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Electrical and Automobile accessories

Lamps of all kinds.

Ask for our weekly price list.

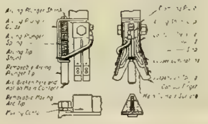
320 St. James St. - Montreal

Westinghouse Weather-Proof Oil Circuit Breakers

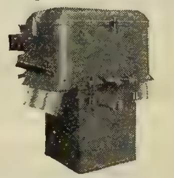
These breakers will protect your transmission lines from winter winds, freezing, snows, and sleet.

Type F-3

Capacities up to 200 amperes, 15,000 volts; 600 amperes, 7500 volts; 800 amperes, 4500 volts.



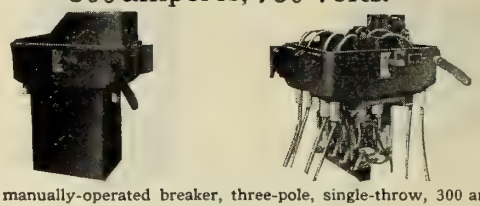
Details of Type-F contacts, showing main-contact fingers and arcing tips used on 300-ampere breakers.



Type F-3 weather-proof, electrically- or manually-operated, wall or pipe mounting, three-pole, single-throw, 600-ampere, 7500-volt breaker.

Type F-1

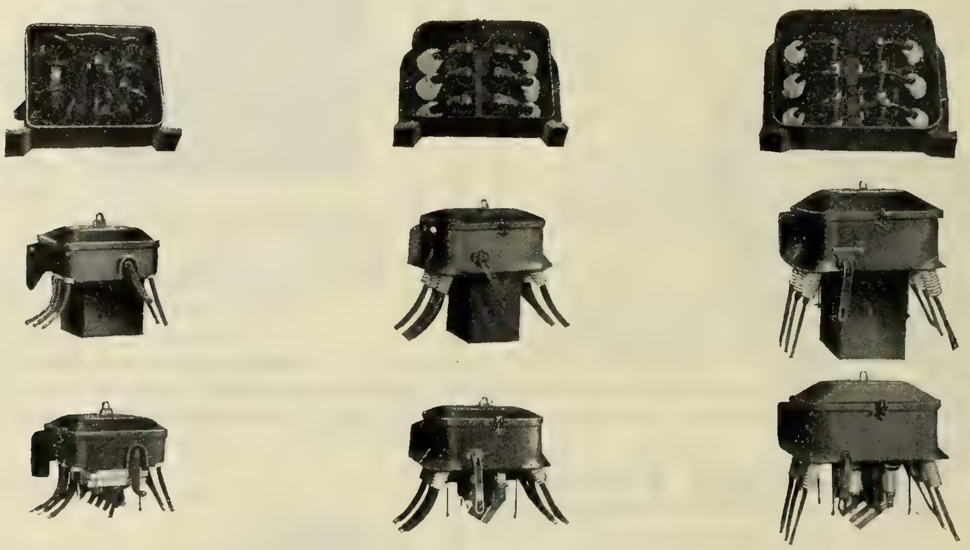
Capacities up to 200 amperes, 4500 volts; 300 amperes, 750 volts.



Type F-1 manually-operated breaker, three-pole, single-throw, 300 amperes, 750 volts; series trip, automatic overload, with inverse time limit and under-voltage release attachments.

Type D

Capacities up to 200 amperes, 15,000 volts; 300 amperes, 7500 volts.



Top View, Cover Removed.

Exterior View.

Interior View, Tank Removed.

3-pole, double-throw, 200 amperes, 4500 volts. 3-pole, single-throw, 300 amperes, 7500 volts. 3-pole, single-throw, 200 amperes, 15,000 volts.

Type D Manually-Operated, Non-Automatic, Oil Circuit Breakers.

Canadian Westinghouse Co., Limited, Hamilton, Ont.

TORONTO, Bank of Hamilton Bldg.
HALIFAX, 105 Hollis St.
CALGARY, Canada Life Bldg.
MONTREAL, 285 Beave. Hall Hill
FT. WILLIAM, Cuthbertson Block
VANCOUVER, Bank of Nova Scotia Bldg.
OTTAWA, Ahearn & Soper, Ltd.
WINNIPEG, 158 Portage Ave. E.
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TORONTO—366 Adelaide St. W.
VANCOUVER 1090 Mainland St.
WINNIPEG—158 Portage Ave. E.
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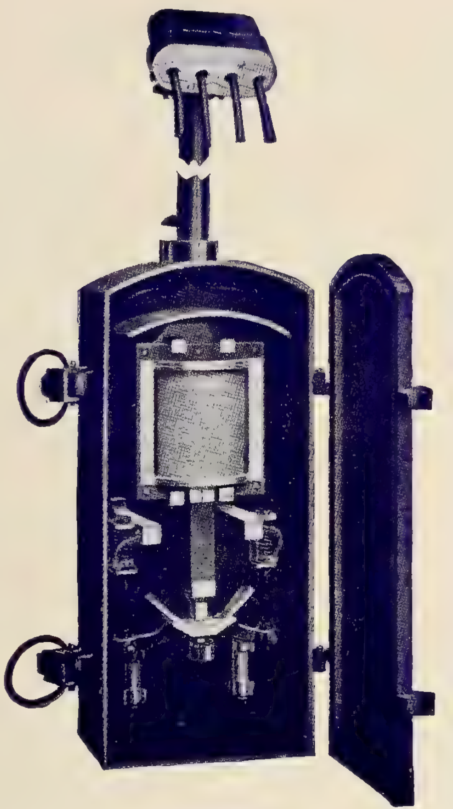
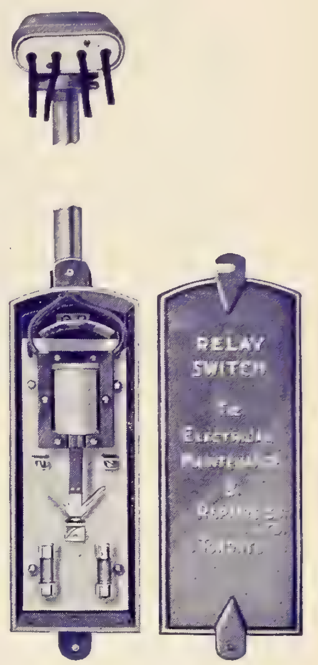
CANADIAN WESTINGHOUSE



Cap. 30 Amp



Cap. 15 Amp

Engineers, Take Notice!

A new, smaller, simplified Remote Control Switch.

A young friend of our 30 Amp Switch—to do the many small jobs where the big fellow is too expensive.

Cheaper, yet perfectly dependable. Has been tested equal to five years' service.

For Street Lighting Control. Write about this.

The Electrical Maintenance & Repairs
Company, Limited
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Approved by the Hydro-Electric Commission of Ontario
Labelled under supervision of Underwriters' Laboratories

GALVANIZED

Made in Canada Conduit

Electrical Wiring Made Safe

For All Electrical Installations

Manufactured by
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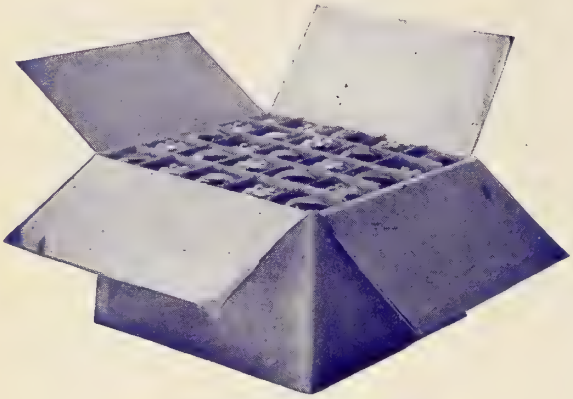
Sales Agents for Manitoba and Saskatchewan—Filer-Smith Machinery Co., Limited, Winnipeg.

White's Porcelain Strain Insulators



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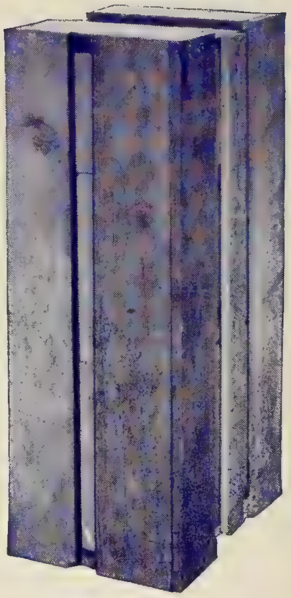
We are now packing our insulators in cartons.

No mussy sawdust.

No breaking.

Easily counted.

Easier handled and stocked.



STANDARD PACKAGE

Try some of our insulators—They all have a very uniform brown glaze, a very distinctive color, no black spots or discoloration.

T. C. WHITE ELECTRICAL SUPPLY COMPANY

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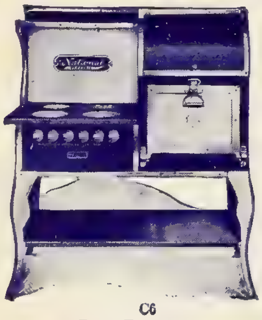
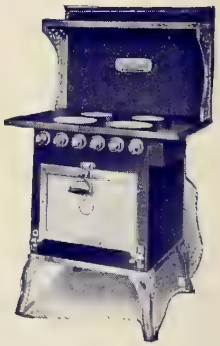
National ELECTRIC



C6
C-6 Range

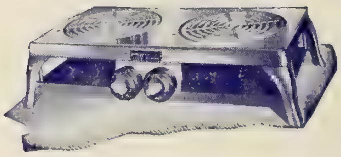


A-4 Range

Ranges, Water Heaters and Hot Plates

Show these Appliances in your Store and be prepared to meet the demand

Water Heater



Two Burner Hot Plate

The National Electric Heating Co., Limited, Toronto

MONTREAL
49 Mountain Street

WINNIPEG
52 Albert Street

VANCOUVER, B.C.
1001 Standard Bank Bldg.

Vol. XXXI No. 19

Toronto, October 1, 1922

Electrical News

Engineering
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Merchandising
Transportation

by Air-Alone

by Air-Alone

ROYAL

QUALITY SERVICE

ELECTRIC CLEANER

PROGRESSIVE dealers from coast to coast, recognizing the growing popularity of the 100% air-type cleaner, are getting behind the Royal as the outstanding cleaner of this type.

For the Royal Electric Cleaner gives more value per dollar of cost than any other cleaner on the market and this greater value is at once evident to the housewife, who sees a demonstration.

Hence Royal sales are easily made and every sale opens the way to more sales of other appliances to satisfied customers.

The Royal Agency is still open in a limited number of cities and towns. Write to-day for complete information.

Made in Canada

Manufactured by

Continental Electric Co.
Toronto, Ont. Limited

Distributor:
Munderloh & Co., Ltd., Montreal, Quebec

"Hard to Compete With—Easy to Sell"

Alphabetical Index to Advertisers, Page 10

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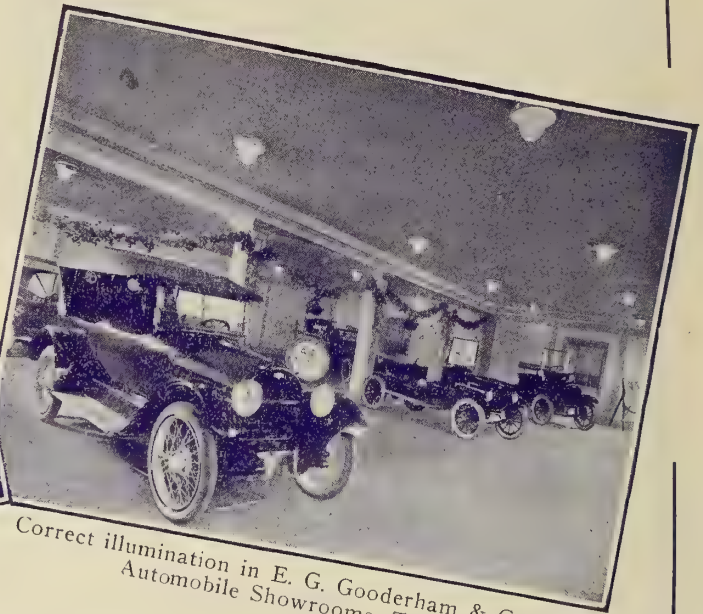
For Better Illumination

Correct illumination in one of the Dominion Rubber System's Workrooms.



Correct illumination in E. G. Gooderham & Company's Automobile Showrooms, Toronto.

These Installations solved two problems of Correct Lighting

Your territory teems with unsolved lighting problems. Many factories, offices. stores, hotels, churches, theatres and other public buildings are poorly illuminated. New buildings are constantly being erected. Every lighting prospect has its own peculiarities, to meet which a variety of fixtures are designed. It becomes a question of correct application. Let our illumination specialists assist you in deciding the form of lighting best adapted to your clients' needs.

Write our nearest house

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LIMITED

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HALIFAX	HAMILTON	WINNIPEG	EDMONTON
QUEBEC	LONDON	REGINA	VANCOUVER

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- Automatic Telephones
- Wires & Cables
- Fire Alarm Systems
- Radio Sending and receiving Equipment

DISTRIBUTING
- Construction Material
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- Power Apparatus
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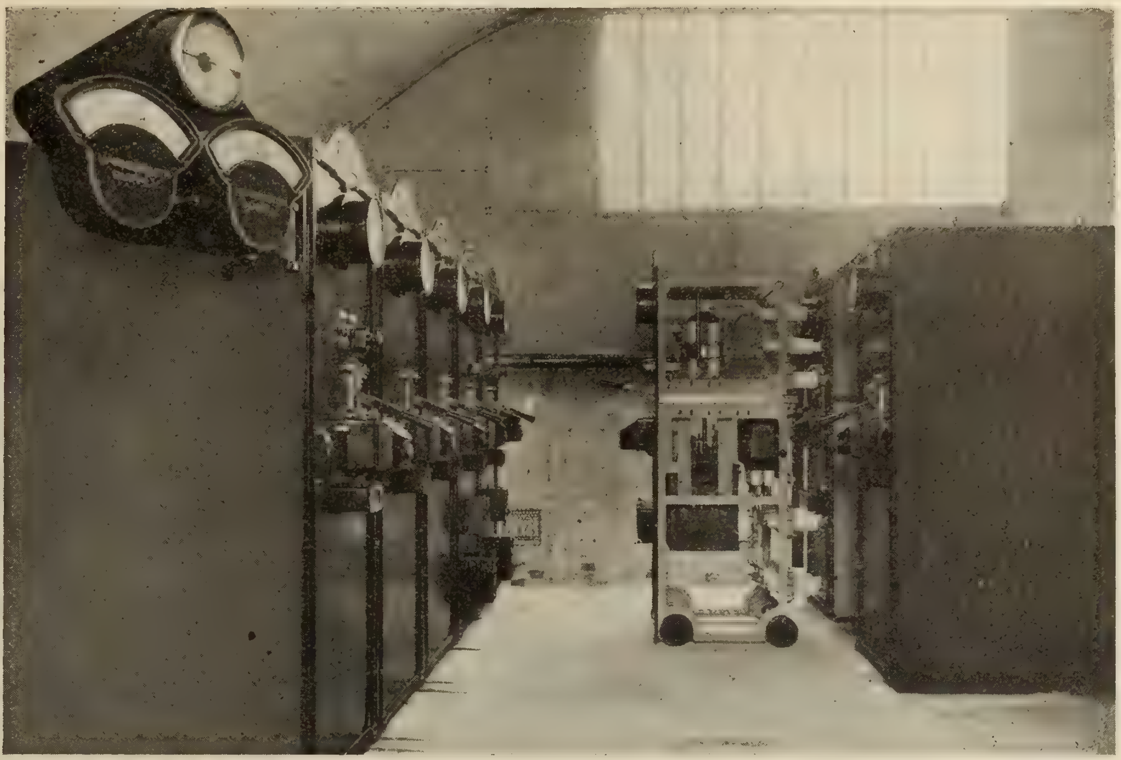
- Marine Fittings



Safety First Truck Type Switchboards

The demand for **safety first** features has led to the development of an **interlocked, interchangeable** and easily **removable** unit type of switchboard, having the following distinctive advantages:

REPAIRS or ADJUSTMENTS can only be carried out to the Breakers, Series and Potential Transformers when in an isolated position.

OPERATION: The Breaker can only be operated in its correct sequence with respect to the main plugging members.

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The trucks are shipped completely assembled. The Cells are shipped knocked down—Few parts are employed and a negligible amount of time is required to erect.

REPLACEMENT AND INTERCHANGEABILITY: All parts jig assembled allowing for interchangeability. Negligible time required to replace faulty equipment by using a spare truck kept for that purpose.

— ALSO MANUFACTURERS OF: —

(1) **Light and Heavy Duty Oil Circuit Breakers all Voltages.**
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(3) **Heavy and Light Duty Bus Bar Supports.**
(4) **Ironclad, fully interlocked Industrial Switching equipment.**
(5) **Series Transformers etc.**

FP

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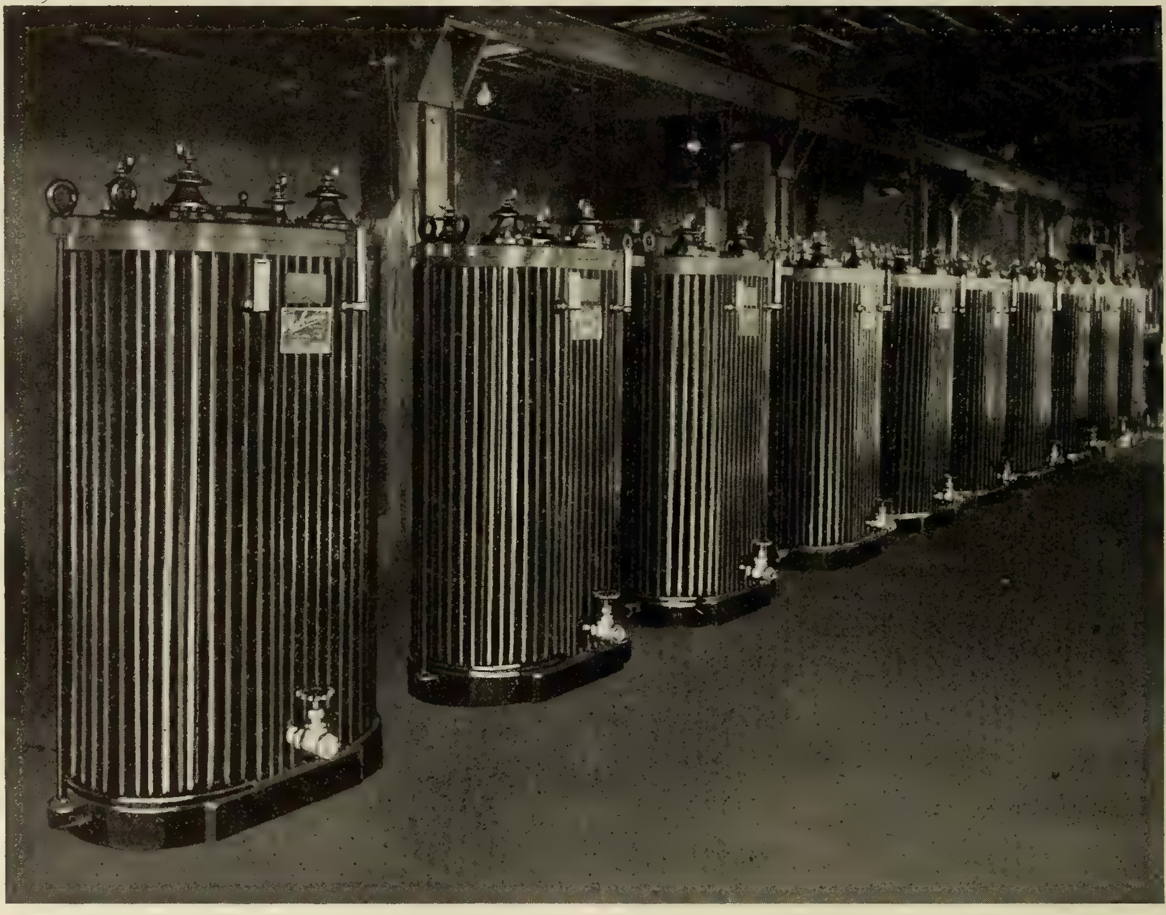
Canadian Office and Warehouse - 321 King Street East, Toronto

HERMAN K. ANSINGH, Canadian Representative—Formerly Design Engineer with the Westinghouse Electric and Manufacturing Co., Pittsburgh, Pa.

Packard

TRANSFORMERS



A Bank of Transformers ready for shipment to the Queenston Generating Station of THE HYDRO ELECTRIC POWER COMMISSION OF ONTARIO where appearance as well as quality is essential.

Get in touch with our nearest agent now.

Others may follow, but we lead

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St. Catharines, Ontario

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703 Confederation Life Building, Winnipeg

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THE nearness of a great building expansion is already felt. Homes are so fundamentally essential that they defy economic laws, baffle predictions, and mock depression.

Authoritative reports show that $2,500,000,000 will be spent on the 1922 building program, and each new settlement or expansion means extended feeders and enlarged trunk lines for electrical service.

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The function of Johns-Manville fibre conduit in any such work is so basic that it must be reckoned with in relation to labor, maintenance, and even finance. And here is its claim, now plainly proven by years of testimony—it is the most economical system per trench-mile-year.

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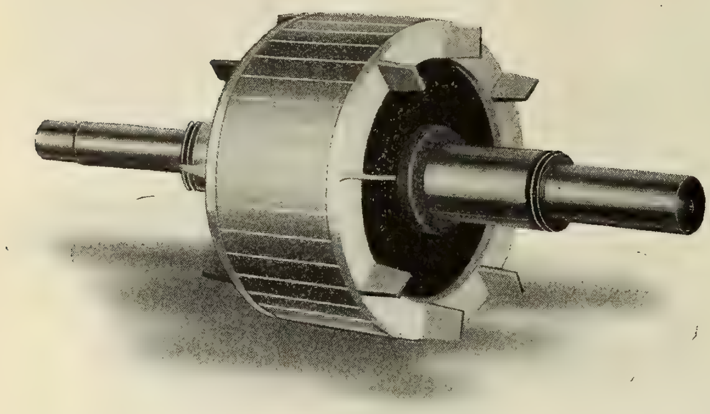
"Exclusively"

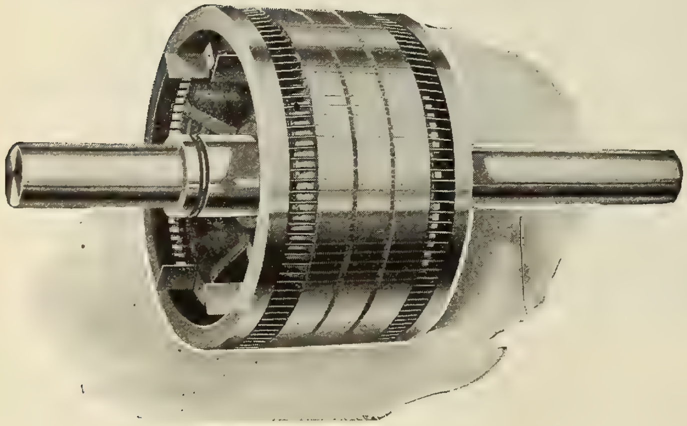
An unquestioned and exclusive improvement comes in Canadian Crocker Wheeler rotor design



Canadian Crocker-Wheeler Cast Winding Squirrel Cage Rotor

(*for small motors*)

In this construction the rotor bars, short circuiting rings and fans are all made of the same material and are cast at one operation. No soldering, no rivets or screws to loosen and come away. There can be no sparking or arcing between bars and rings. Means smoother running and longer life. Used in small motors.



Canadian Crocker-Wheeler Cast Welded Squirrel Cage Rotor

(*for larger motors*)

A solid short circuiting ring is cast welded to the rotor bars. Each ring is thus positively locked to the bar and becomes solidly welded to it. Failure between the two—which was the great and constant weakness of older designs—is therefore impossible. This design is used in moderate and large size motors.

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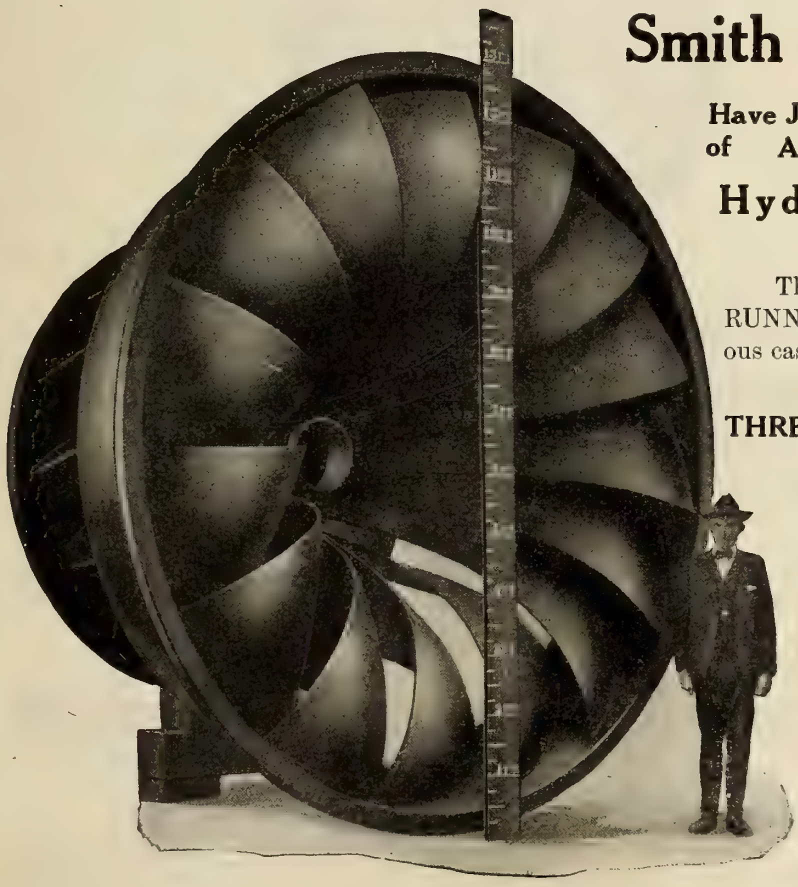

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THREE TURBINE UNITS (of which these runners comprise the rotating element) furnished for installation in the Yadkin Falls, N. C., plant of the Aluminum Co. of America. Each unit develops 10,000 H.P. at 90 R.P.M. under 48 feet head, using water at 92 per cent efficiency.

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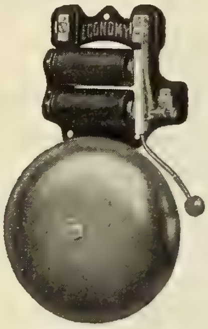

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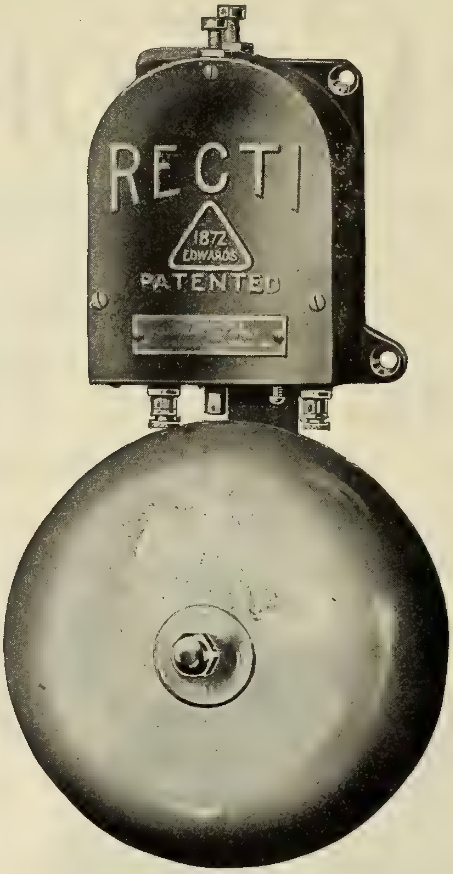

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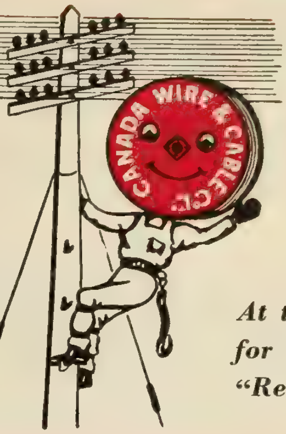
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Incandescent Lamp Cord, Flexible Switchboard Cables, Special Cords and Cables for all kinds of Electrical Work.

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A high class interior construction conduit of the enamelled type, proof against acid or other corrosive agents.

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Order the "Northern" Heating Pad

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Size 12"x15"

Extra heavy eider-down cover

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A B C's
Sure are Selling!

The finest washer built

Cylinder reverses after each revolution

Aluminum wringer —locks in any of 20 positions

50% oversize motor

All gears machine cut

Quiet and vibrationless in operation

At Vancouver, the David Spencer Company —a new A B C dealer—sold 18 *Super Electrics* at $180 each during the first two weeks. Latest reports indicate that this pace is being splendidly maintained.

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About fifty A B C *Alco's* have been sold so far this year by Ellis & Howard at Kitchener, Ontario—a city of approximately 20,000.

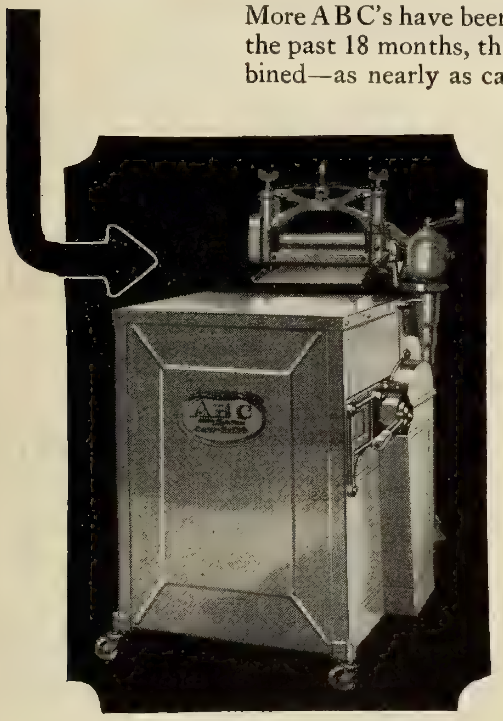
More A B C's have been sold in the Maritimes, the past 18 months, than all other makes combined—as nearly as can be determined.

Blackadar & Stevens, the A B C Distributors, are on their toes assisting our dealers along real specialty selling lines.

These are just a few examples. Space forbids quoting more. In every province, A B C's are selling fine. In fact the A B C Line is showing the most rapid gains in sales of any important line of electric washers on the market.

An established reputation, matchless values, a complete line, liberal dealer discounts and real co-operation—these are some of the principal reasons that are making the A B C Line the leader.

Get our proposition. It bristles with good features. Write or wire today.



A B C "Alco" Washers
(Dolly or rub board)

No. 51, single tub, engine drive
No. 52, double tub, engine drive
No. 51-E, single tub, ¼ h. p. motor
No. 52-E, double tub, ¼ h. p. motor

A B C Electric Oscillator

Greatest value ever offered at the price. Full size 6-sheet copper tub, swinging wringer, springless mechanism. Rigid frame. Enclosed parts.

No. 80-E $135

A B C
SUPER ELECTRIC
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With Copper Tub—$200

All prices quoted are retail, except in B. C. and the Maritimes

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A Single Wall Conduit of Unusual Flexibility.

Every coil of "Loomduct" and "Insuladuct" is fished at the factory and guaranteed against defects of every kind.

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A Double Wall Conduit of Great Strength and Durability.

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We have been supplying this pole line material for years, from coast to coast, to the largest telephone, telegraph and electric lighting systems.

Our goods are specified where efficiency and economy are measured by actual results and not by purchase price only.

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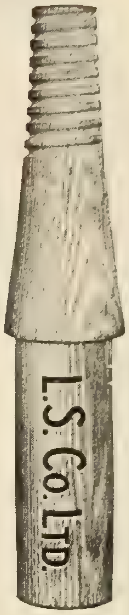

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Type "C"—Bottom Terminals

We have a large stock of these meters which can be supplied with either clock or cyclometer type of dial, and in six terminal or seven terminal styles. The shunt leads are brought out to a separate terminal in the "Seven Terminal" meter, which isolates the Line Voltage from the current coils, thereby reducing chance of short-circuits between coils, and coils and case.

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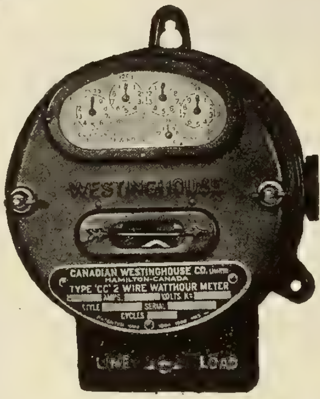
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CANADIAN WESTINGHOUSE CO. LIMITED
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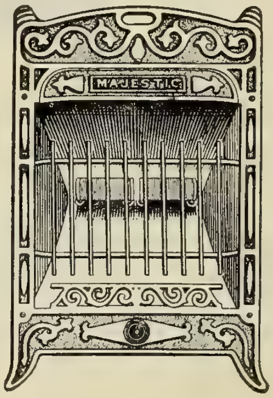
LINE
LOAD

The Short
Safe Way
from

TRICABLE



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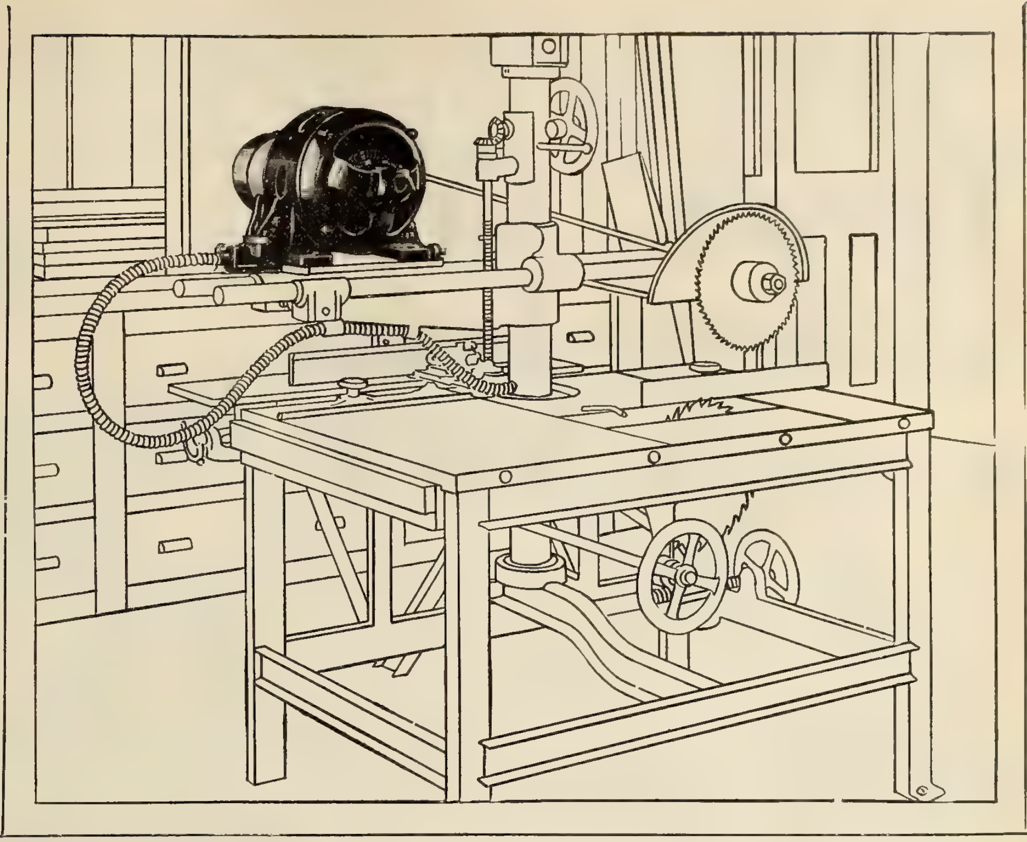


Wagner, Quality

Where motors are not "coddled"

—it takes a better motor to withstand inexperienced handling

AS installations go, there is nothing remarkable about this motor. It is not used to drive a wonderful machine, nor is it a part of a great manufacturing establishment. On the contrary, it is driving just an ordinary saw in a little carpenter shop located in one of the large eastern cities. There are no expert motor men or electricians to look it over even once in a while—just started and stopped by men interested in the other end of the business who have neither the time nor the inclination to "coddle" a motor.

Throwing the switch to start or stop it is all they ever do. They count on the motor to do the rest and their confidence has not been misplaced. And there are thousands of other Wagner, Quality motors working faithfully, silently and steadily on coffee grinders, washing machines, pumps, etc., handled by people who know nothing about motors. They never come to attention because they never require attention—which is as a good motor should be.

Send for Bulletins 122 13 and 127 13, fully describing Wagner polyphase and single-phase motors, respectively.

WAGNER ELECTRIC MANFG. COMPANY OF CANADA, LTD.

Power Building, Montreal

217 Dundas St., Toronto

Wagner, Quality

40° MOTORS AND "BLUEBLOOD" TRANSFORMERS

WAGNER ACHIEVEMENTS

Producers of the

FIRST COMMERCIALLY SUCCESSFUL SINGLE PHASE MOTOR

UNITY POWER FACTOR MOTOR

Pioneers in

HIGH VOLTAGE POWER AND LIGHTING TRANSFORMERS

AUTOMOTIVE STARTING LIGHTING AND IGNITION SYSTEMS

DIRECTED DRAFT MOTORS (The Pow-R-full)

2620

"Just finished driving

Twenty Gross without losing a single Screw"

So exclaims an enthusiastic user of the socket head screw—a progressive Toronto electrical contractor, who knows a good thing when he sees it. He further says:

"I can only figure on about 125 slotted head screws to the gross because we drop so many, and of course when you drop a screw it's gone usually. I'm strong for the socket head."

There is simply no doubt about it, the Robertson socket head screw is the only screw for the electrical trade. It saves time and loss of screws, prevents gashed fingers and woodwork and gives the screw a positive and efficient drive which is impossible with the use of the old uncertain slotted screw.

The socket head screw does not drop off between partitions and become lost.

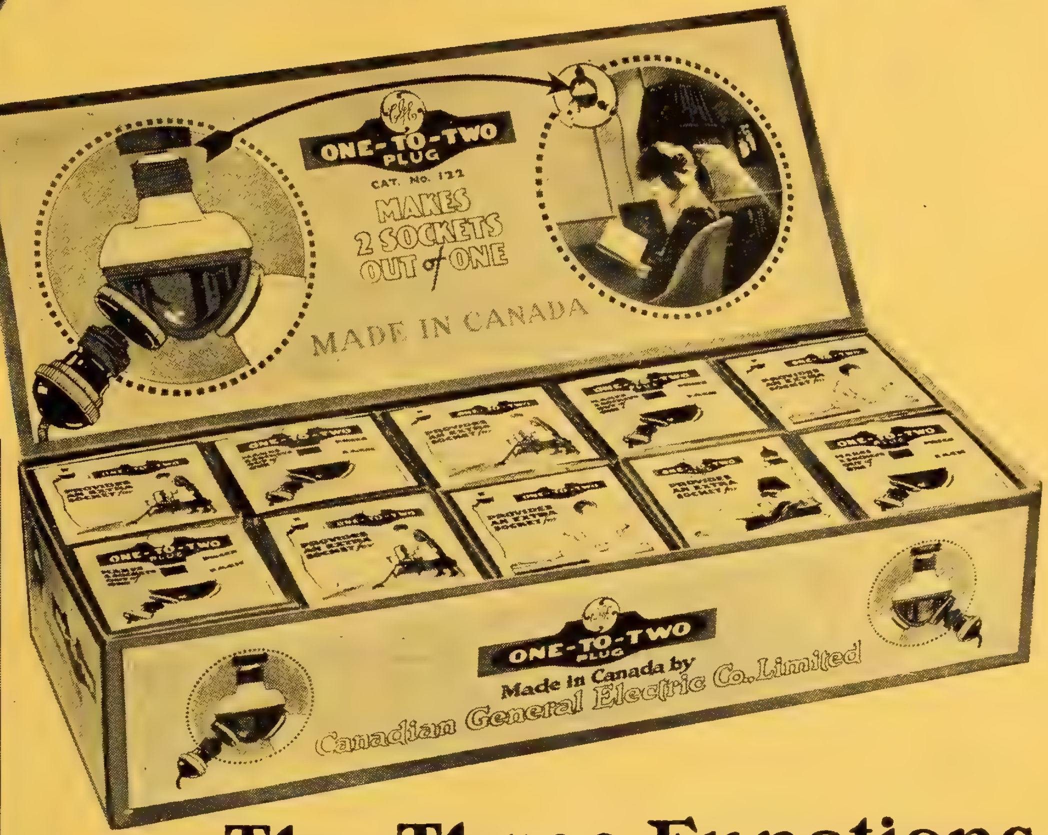
Let us send you a trial outfit. This will convince you.

Simply slip the screw upon the end of the driver—there it stays until you wish to withdraw it. It can't wobble, it can't slip. The screw is driven positively and accurately, and when once started requires no pressure to keep driver in place.

P. L. Robertson Manufacturing Company, Limited

Milton Ontario

Attract Attention—Arouse Interest—Stimulate Desire



The Three Functions of a Good Display

THE C.G.E. One-To-Two Plug, conforming to the C.G.E. merchandising policy of packing wiring devices in individual and artistically labelled cartons, is meeting with an enthusiastic reception everywhere.

C.G.E. Wiring Devices, with their distinctive orange and blue labels, practically sell themselves. For example, by dressing your window with One-To-Two Plugs you cannot help but develop an excellent display, which will have its effect on your cash register. The striking design of the carton showing the adaption of the plug, to one or more of its many uses, and the message that it makes "Two Plugs out of One" will attract attention—arouse interest and stimulate desire.

A supply of imprinted folders will be forwarded upon request.

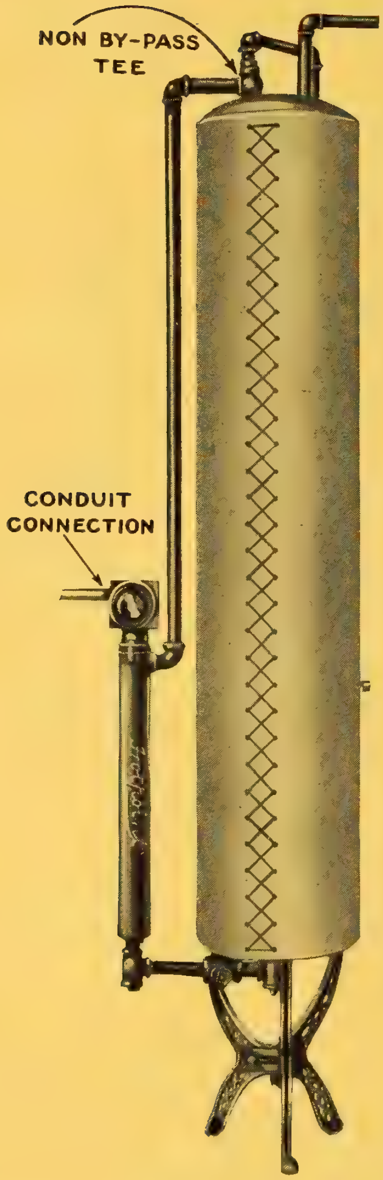
Canadian General Electric Co., Limited

HEAD OFFICE TORONTO

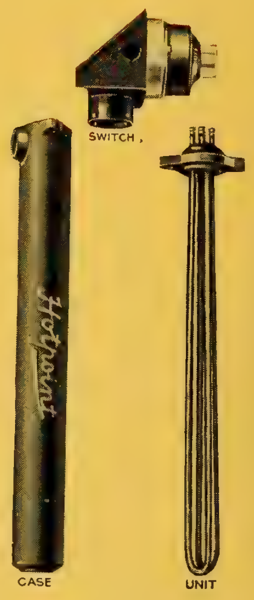
Branch Offices: Halifax, Sydney, St. John, Montreal, Quebec, Cobalt, Ottawa, Hamilton, London, Windsor, South Porcupine, Winnipeg, Calgary, Edmonton, Vancouver, Nelson and Victoria.

The New

Hotpoint



Water Heater



Cashing In On The Coal Shortage

Thousands of families will be short of fuel this winter. Everybody will have to economise as much as possible. And yet, hot water is an absolute necessity in any home. This is your opportunity to materially increase your turnover on Hotpoint Water Heaters. Just imagine

Shaving water in one minute with the 3 K.W. Heater, and a bath in twenty. Cost of operation 3¾¢ per hour.

Assuming cost of current to be 1¾c per kilowatt hour, and the heater operating on full, cost of operation is 3¾c per hour, but only on wash days is it necessary to operate on full for any length of time.

The metal clad element of the Hotpoint Water Heater is protected from oxidation in exactly the same manner as the filament in an electric lamp. The chances of a burnout are practically eliminated.

Your jobber or our nearest sales branch can supply you with these heaters.

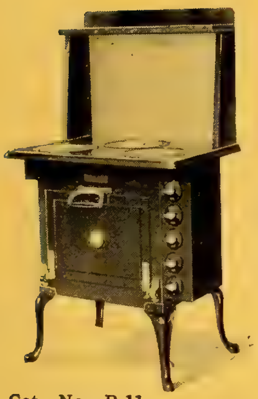
"Made in Canada"

Canadian General Electric Co., Limited

HEAD OFFICE TORONTO

Branch Offices: Halifax, Sydney, St. John, Montreal, Quebec, Cobalt, Ottawa, Hamilton, London, Windsor, South Porcupine, Winnipeg, Calgary, Edmonton, Vancouver, Nelson and Victoria.

The New Hotpoint RANGES



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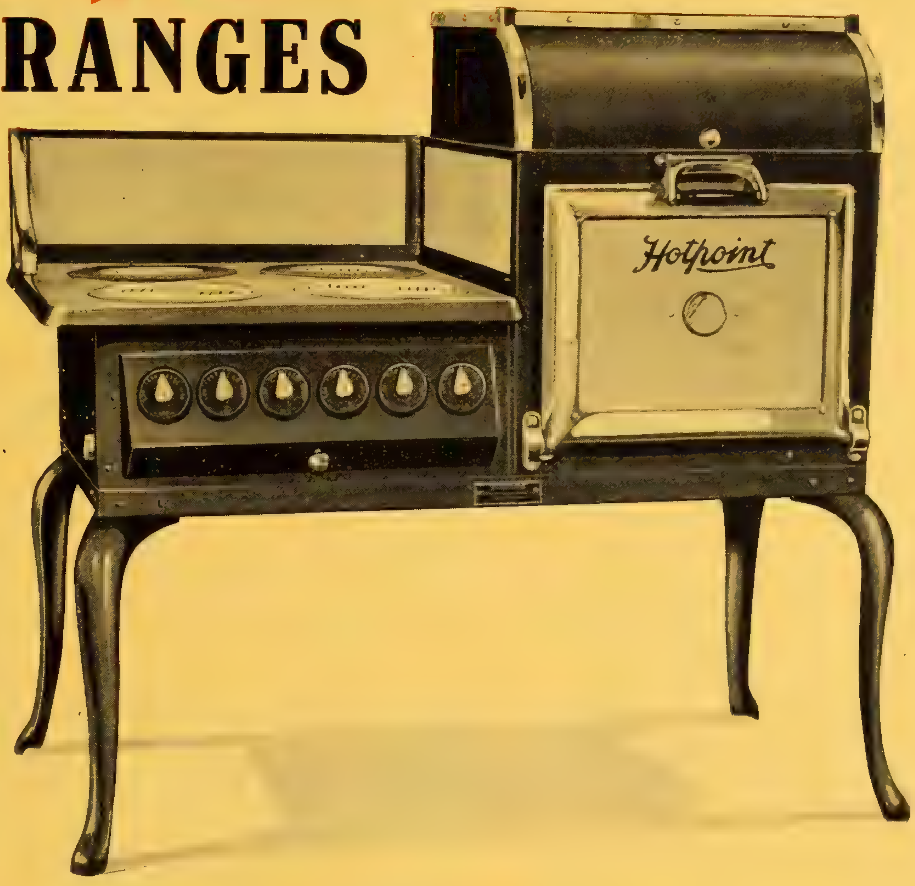

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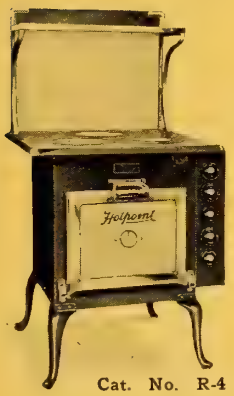

Cat. No. R-4

Electricity Will Have To Do Double Duty in Many a Canadian Home This Winter

People who have never even seriously considered the possibility of cooking by electricity will be in a most receptive mood for some very profitable missionary work, duirng the next few months. The new line of Hotpoint Ranges, that have been designed to meet the requirements of every family, will be in great demand this winter.

The new R8 Range, illustrated above, has several new features that have already made it a popular model with the housewife. It has 40 per cent. less surface to clean and yet has the same cooking capacity as the standard cabinet range. Each switch is mounted separately, and can readily be removed without disturbing the remainder.

The warming closet is designed to allow practically the same clearance when the door is opened, as the old No. 50 Hughes Range. No element is installed in the warming closet owing to special construction of the oven, approximately the same temperature is obtainable as with a 600 watt unit, without loss of heat to the oven. The warming closet provides a shelf on top—no left hand models are required.

"Made in Canada"

Canadian General Electric Co., Limited

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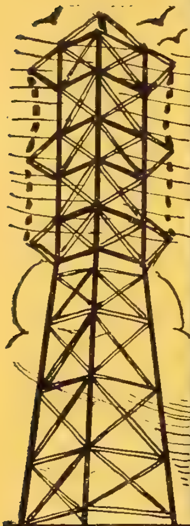
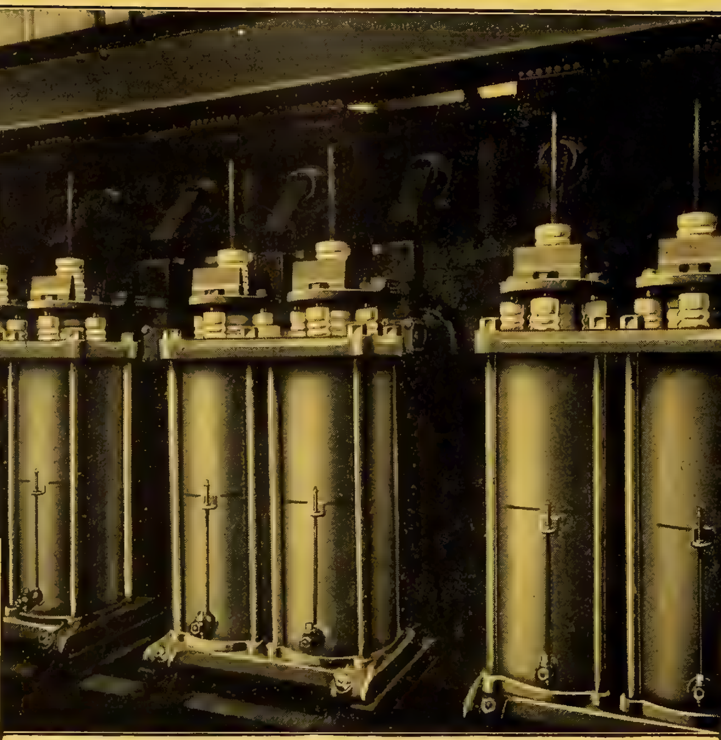
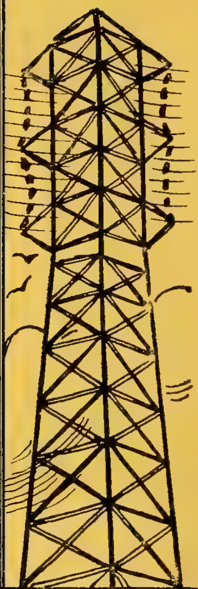
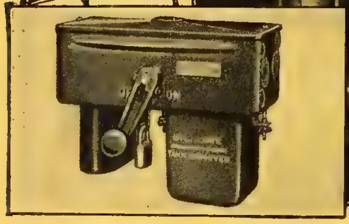


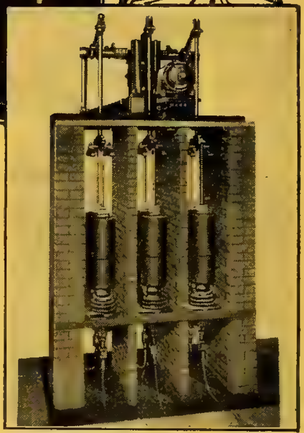




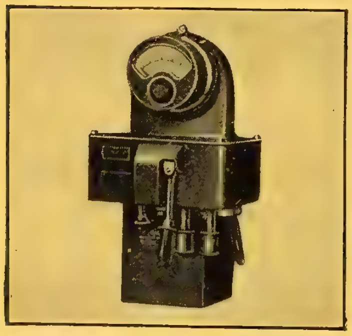


FP-10 OIL CIRCUIT BREAKER FOR SMALL CAPACITY INDUSTRIAL CIRCUITS.

FHD-21 Oil Circuit Breaker for Queenston, Interrupting capacity 1,500,000 kv.a., operating mechanism on I-beams above



FH-3 OIL CIRCUIT BREAKER FOR USE ON LARGE CAPACITY SYSTEMS.



FK-20 OIL CIRCUIT BREAKER (WITH AMMETER) FOR GENERAL INDUSTRIAL SERVICE.

C. G. E. Oil Circuit Breakers

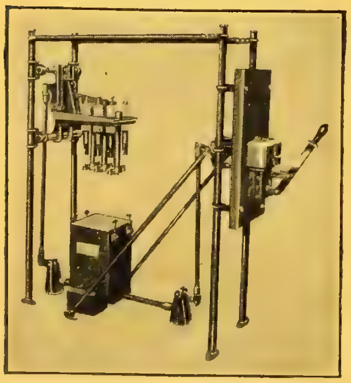
THE use of alternating current has resulted in an amazing extension of the application of electricity for all kinds of service. The necessity of safely controlling its transmission and use, has resulted in a corresponding advance in the design and manufacture of Oil Circuit Breakers, which are generally recognized as being the best means of control.

Mills and Factories find it both practical and economical to use alternating current exclusively and many of the more modern ones are equipped throughout with Oil Circuit Breakers instead of air break switches and fuses. The Canadian General Electric Company carries a complete line of Industrial type Oil Circuit Breakers.

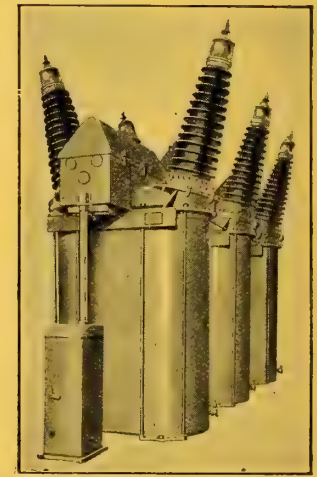
Power Plants and Sub-stations of moderate capacity and voltage, have a complete range of C.G.E. Oil Circuit Breakers from which to select the type that best fits the actual local conditions.

C.G.E. Oil Circuit Breakers, for potentials up to 220,000 volts and for interrupting capacities up to 1,500,000 kv.a. or even higher, can be supplied for large systems and "Super-power" plants.

The correct application of Oil Circuit Breakers involves deciding on (a) normal voltage rating, (b) normal current rating, (c) short time current rating, (d) interrupting capacity, (e) arrangement, (f) method of operation and (g) automatic protective features. Our Engineers will be glad to assist you in arriving at the best solution of your Oil Circuit Breaker problems.



FK-5 OIL CIRCUIT BREAKER FOR USE ON SMALL AND MODERATE CAPACITY SYSTEMS



HIGH TENSION FKO-36 OIL CIRCUIT BREAKER.

Canadian General Electric Co., Limited

HEAD OFFICE TORONTO

Branch Offices: Halifax, Sydney, St. John, Montreal, Quebec, Cobalt, Ottawa, Hamilton, London, Windsor, South Porcupine, Winnipeg, Calgary, Edmonton, Vancouver, Nelson and Victoria.

It has been proven that each "Colonial Maid" Blue Bird Washer directly sells 5 more

"COLONIAL MAID" WASHES BETTER
Blue Bird
ELECTRIC CLOTHES WASHER

Isn't that the kind of article you want to sell?

The improved "Colonial Maid" Blue Bird sells more readily than others because:—

It is known to be the most efficient and quickest.

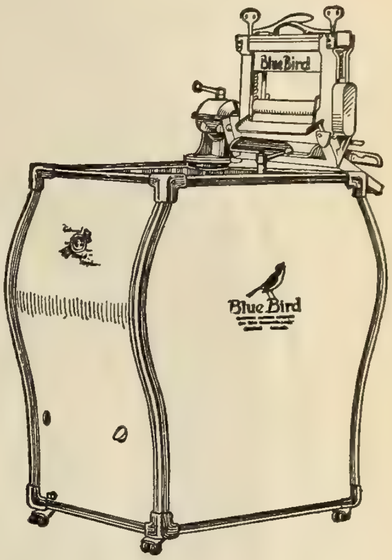
It has the best appearance of any washer.

Its 4,000 satisfied users are always advertising it.

Its entirely enclosed cabinet makes it safe.

It is all Canadian made and fully guaranteed.

Write for details of our exclusive agency and time payment financing plan.

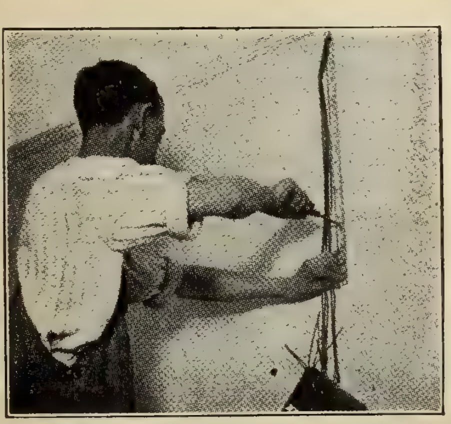


BLUEBIRD CORPORATION LTD.,
Brantford, Ontario

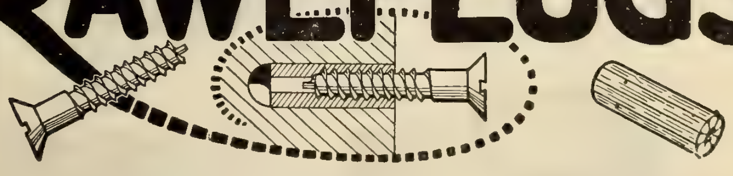
Wherever a Screw is Used

"Fix it with Rawlplugs"

Where screws are used for fixing electrical wires, cables, pipes, brackets, etc., they will be held longer and more securely by Rawlplugs. Vibrations and strains are absorbed, they never fracture the material, a smaller hole is required than for other devices, and they are absolutely permanent. Millions now in use. Have you tried them?



RAWLPLUGS



INVENTIONS LIMITED

Sole Agents for the Rawlplug Co. of Canada

Southam Building Bleury Street Montreal

Sales Agents for Ontario: Dominion Engineering Agency, Limited, 24 Adelaide St., East, Toronto. Stocks carried by: Rice Lewis Co., Toronto; Factory Products, Ltd., Toronto.

The Rawlplug Company, 461 Eighth Ave., New York City.

The Original
Sunnysuds
Sunnysuds
Sunny

Moderately Priced Cabinet Electric Washer

The Sunnysuds Has Lost None of Its Sensational Appeal. Still the Acknowledged Leader

The astounding success of the Sunnysuds from the day of its announcement 18 months ago, has resulted in its being accorded the highest tribute possible—that of nationwide approval.

That the Sunnysuds should have enjoyed an amazing popularity from the outset is easy to understand. It was the first high-grade, all-metal cabinet electric washer to retail at a moderate price. It was announced at a time when the public was unwilling to purchase higher priced washers, and was actually waiting for a machine within reach of its purse; and when dealers, unable to move higher-priced washers, were eagerly seeking one that could be sold in volume—and with profit.

So it is easy to understand why our first year's output exceeded 20,000 Sunnysuds, and why the number of dealers actually selling this remarkable washer should increase from none to more than 1100 in the same time. It is also easy to understand why others have freely adopted the idea originated by Sunnysuds, of building a washer to sell for a moderate price.

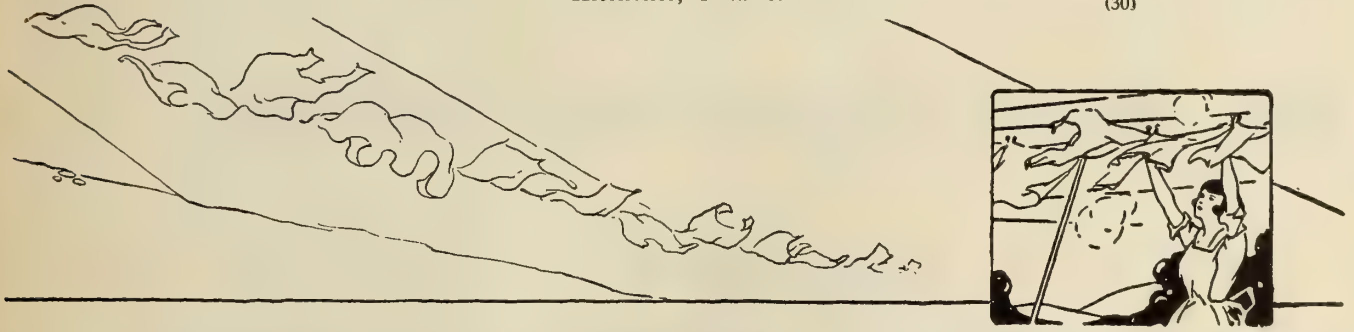
The Sunnysuds of today is even better than the original Sunnysuds which created such a sensation, and won such enthusiastic approval on the part of dealers and the public. It embodies sound refinements and improvements made in accordance with our established policy of bettering our product wherever possible.

With its marvelous action tub that is the result of many months experimentation and development, and with every part and detail having successfully withstood the gruelling test of service in 20,000 homes, the Sunnysuds today is not only the original, but we believe, the *finest* all metal, moderately priced, standard size, cabinet electric washer!

Although our dealers number over 1100, there are still some localities where able, aggressive dealers can secure the valuable Sunnysuds franchise. Perhaps your town is one of them. Write at once for complete details.

ONWARD MANUFACTURING COMPANY
Kitchener, Ontario.

(30)



suds Electric Washer &Wringer

"SOL-LUX"

The New High Efficiency Glass

Trade Mark

Sol-lux
MADE IN CANADA

Registered Canada

For Better Commercial Lighting

MANUFACTURED BY

FACTORY & HEAD OFFICE
388 CARLAW AVE
TORONTO

DOWN-TOWN SHOW ROOMS
164 BAY ST. TORONTO

Jefferson
MADE IN CANADA
Glass
COMPANY LIMITED

285 BEAVER HALL HILL
MONTREAL
272 MAIN STREET
WINNIPEG
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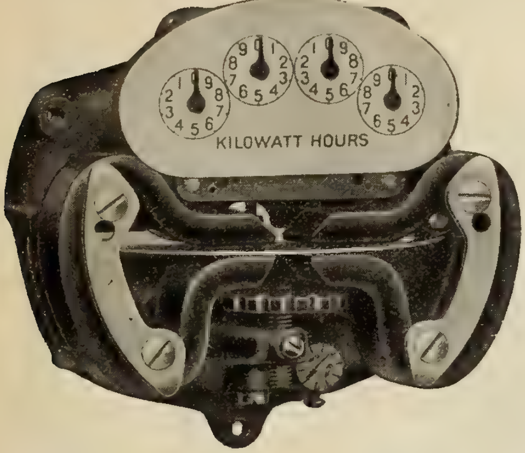
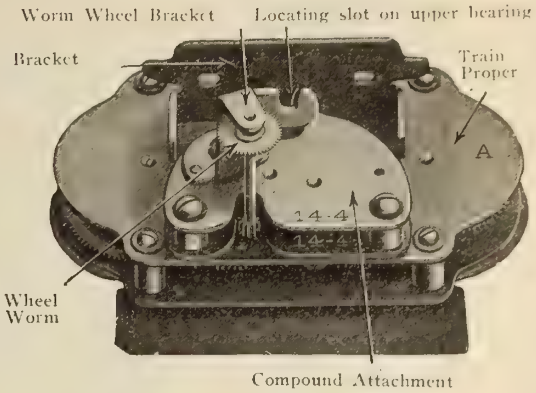
VANCOUVER





Sangamo Meter Trains are Built Right

THE recording train of a Watthour meter **must** be built right or meter accuracy is impossible.

The recording trains of Sangamo meters are built right. Friction in the train is reduced to a minimum through accurate meshing of gears and pinions scientifically cut one tooth at a time like all high-grade gears. Corrosion of parts is avoided by using nickel plated brass throughout. In fact the Type "H" meter will show no difference in speed on a very light load whether recording train is on or off.

With Sangamo Meters the recording train **cannot** be attached incorrectly The entire mechanism is carried on a rigidly formed and swaged brass bracket, accurately located by two dowel pins set in the top face of the grid. This mechanism is held to the grid by two screws very easily accessible from the top when it is desirable to remove the train.

A slot in the worm wheel bracket which engages the upper bearing screw itself insures a positive position and correctly maintained mesh between the worm of the moving element and the worm wheel of the train.

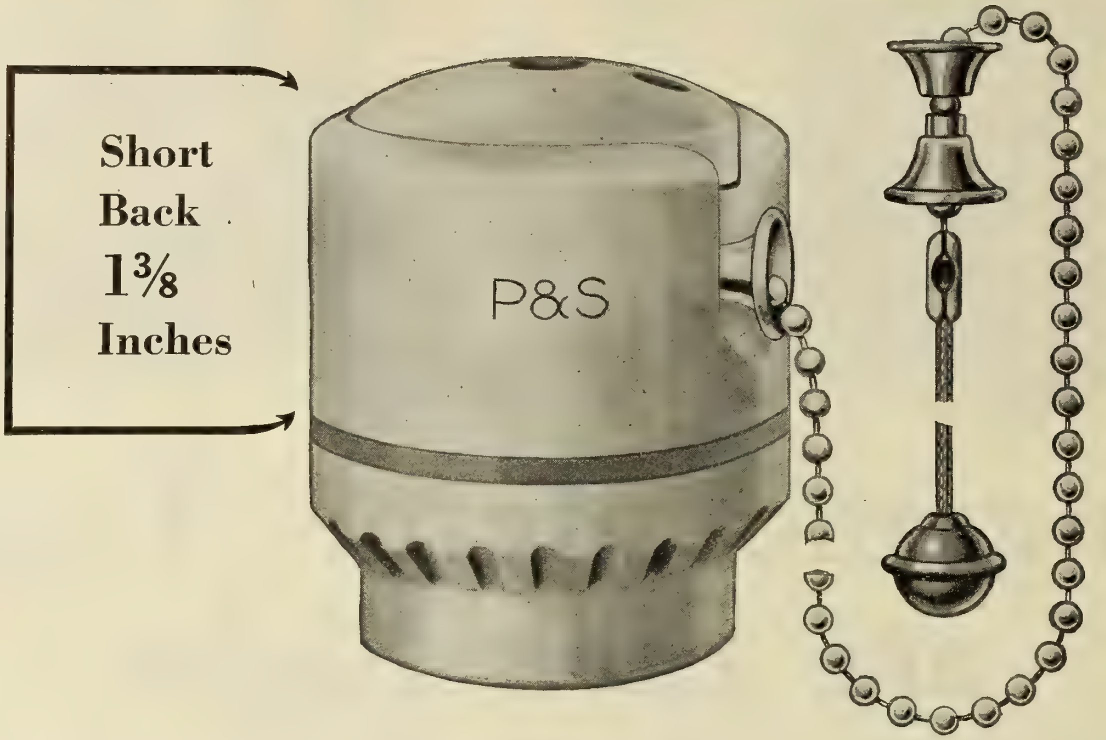
The same careful design which insures accurate performance of the train is carried out in all other parts of Type "H" Meters. Our nearest agents will be glad to give you details. Write us today for bulletin 5518 fully describing Type "H" alternating current Watthour meters.

SANGAMO

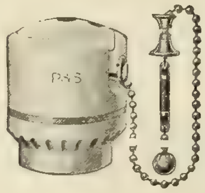
Sangamo Electric Company
of Canada, Limited

Factory: TORONTO

Head Sales Office: MONTREAL



New Short Back Receptacles for Ceiling Lights



P & S 997

8 inch Chain
with Insulator

For Side Wall
Fixtures

***The Demand for a
Short Back Receptacle
for Ceiling Lights
is Met by
P & S***

◆

***Write for a Sample of This
New P&S Device***

P & S 999

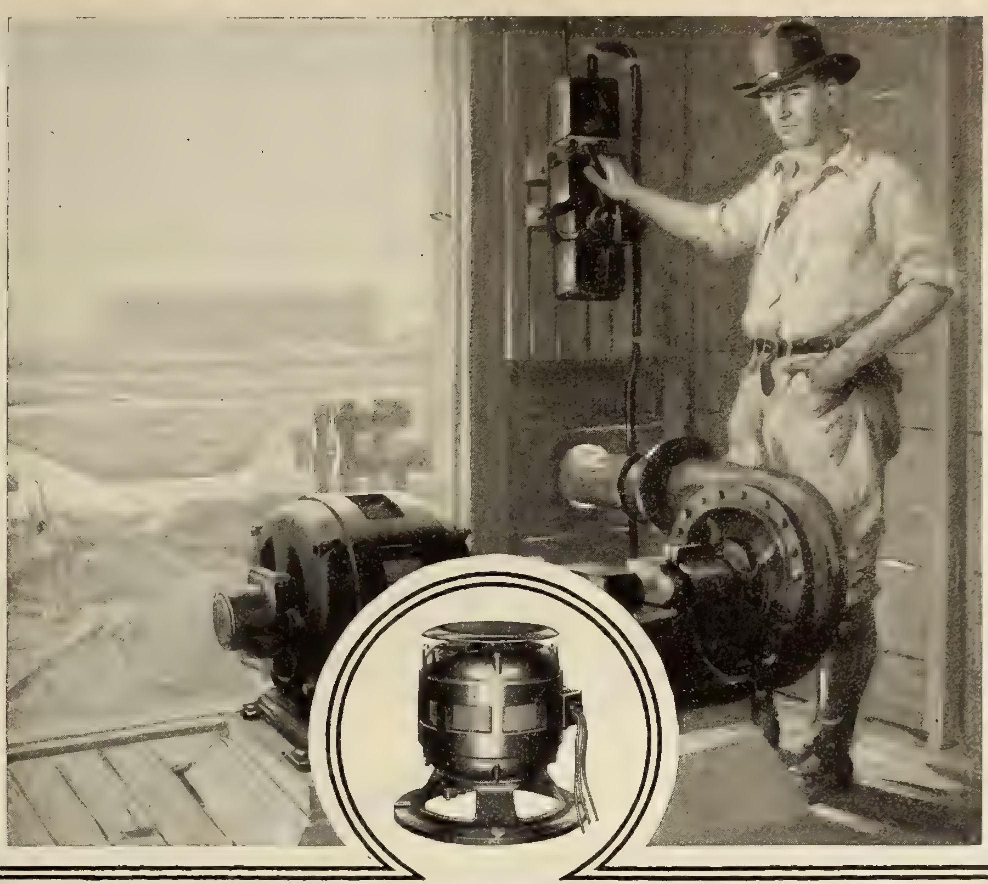
3 foot Chain
and Ball

For Ceiling
Light

Pass & Seymour, Inc.

Solvay, N. Y.

New York Boston Philadelphia Chicago San Francisco



IRRIGATION is a service in which equipment reliability is of paramount importance. The pump and motor do not receive the expert care and constant attention machinery receives in the factory. They are often poorly housed and the plant is usually located on isolated farms or ranches many miles from any source of repair service. A breakdown may mean a long interruption in the service with a disastrous loss in crops.

The records of the thousands of R & M motors, which have won the favor of users, pump manufacturers and engineers in this exacting service, match the records they have made in all classes of industrial service under all sorts of operating conditions.

Motor users, contractors, dealers, and jobbers who are interested first of all in the quality of a product, find real motor satisfaction in the R & M line.

The Robbins & Myers Company
of Canada, Limited

Brantford - Ontario

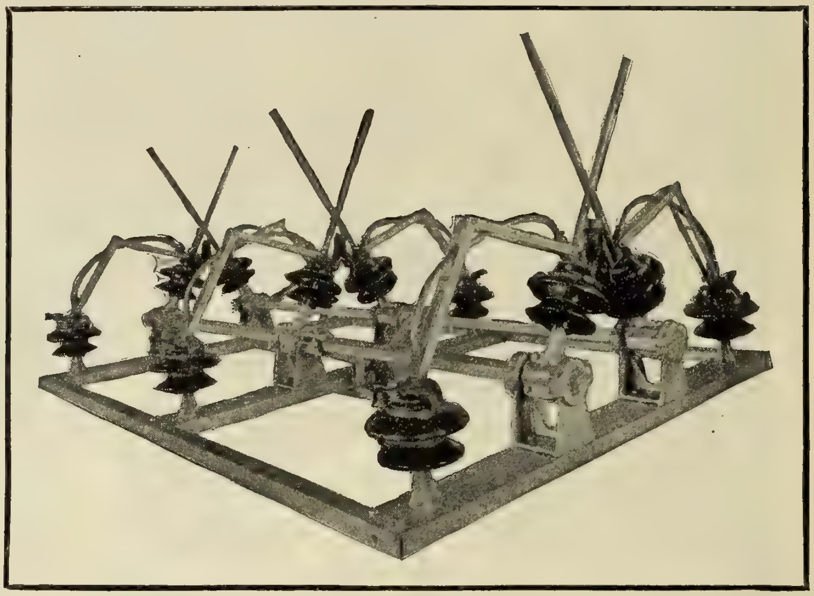
Robbins & Myers Motors

High Tension Securities

A POLE TOP Switch that stands up under gruelling service

We also build the following equipment:

- Indoor Bus Supports
- Indoor Disconnecting Switches
- Indoor Switchboard and Structural Fittings
- Outdoor Disconnecting Switches
- Choke Coils
- Copper Fittings
- Outdoor Substations



Elpeco Pole Top Switches have ruggedness and reliability built into them, and designed along practical lines. This makes them absolutely dependable.

Critical Central Station men specify Elpeco Pole Top Switches for what they will do in an emergency as well as under normal operating conditions.

Note—the vertical break, carrying the arc upwards, away from the switch and line—the square shafts eliminating keys where the insulator pins are bolted, insuring all phases opening simultaneously—the heavy babbitted pedestal bearings making operation of switch easy—contacts are of circuit breaker design.

Built for Manual or Electrical Operation

Renewable wearing parts include:

- Contacts
- Arcing Horns
- Insulator Head Clamps and Pins

ELPECO

ELECTRIC POWER EQUIPMENT CORPORATION
PHILADELPHIA

Canadian Represenţives: FERRANTI METER AND TRANSFORMER MFG. CO., Limited, Toronto & Montreal

Electrical News

Generation, Transmission and Application of Electricity

For nearly thirty years the recognized journal for the Electrical Interests of Canada.

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Physician, Heal Thyself!

The shoemaker's child is proverbially the worst shod on the street and the electrical business seems to be following closely this well-established precedent. It is difficult to understand, however, how any salesman can work up enthusiasm calculated to interest a prospect in the merits of the article offered for sale when the salesman himself is not sufficiently sold on the article to have one in his own house.

Is it not possible that right here is the real cause of the difficulty some of our dealers find in selling appliances—they are not themselves "sold," they cannot speak from experience and, so, their arguments do not carry conviction?

A large group of central stations recently sent a questionnaire to their employees with a view to learning to what extent electrical appliances were used in the various homes. The result would seem to indicate a woeful lack of appreciation for the virtues of the products that they themselves speak of in glowing terms to their customers. report does not state how many questionnaires were sent out, but 490 were returned. It is reasonable to suppose that those who did not return them have no electrical appliances, or so few that they hesitated to make the admission. Of the 490 all but 3 possessed electric irons. There was then a big drop to 349 toasters, then another big drop to 203 vacuum cleaners. Then came air-heaters 159, washing machines 149, grills 133, percolators 128, ranges 105, water heaters 35, and dish washers 1. What, we wonder, is the matter with the dish washer? It does not speak very well for its merits when only one man out of at least 490 thought sufficient of his own arguments to instal one. There is something radically wrong here. Either the dish-washer is no good or the salesmen are no good. In either case the defect should be remedied with as little delay as possible.

It is likely enough that this particular condition—as unearthed by the questionnaire—is not an isolated one. If it is a general rule, however, that electrical salesmen, or men who are engaged in any capacity in the electrical industry have not sufficient faith in that industry and in its products to use them to the fullest extent, right there is where we have a sufficient reason why we are not making more rapid progress. It would seem as though our first task is to "sell" ourselves on the value of electrical equipment.

The Cost of Daylight

A very interesting article was read at the recent convention of the Illuminating Engineering Society, when attention was drawn to a phase of daylight illumination that is very frequently over-looked, namely, its cost as compared with the cost of artificial lighting. In this article a number of specific cases are compared, and the totals shown, item by item, of what it has cost to illuminate buildings of various sizes by daylight and what it would cost to illuminate them by electric light. In a number of cases the cost of daylight is considerably in excess of the cost of electric light.

It was not so very long ago that a badly lighted room, i.e., one into which very little daylight penetrated, was considered a useless room. It was overlooked that that room could be lighted quite as well and perhaps at less expense artificially. Indeed there are many advantages in artificial lighting over daylight. For example, we can get rid of shadows; we can illuminate uniformly and we can guarantee that the amount of illumination supplied is the same at all times of the day and night. If one were arguing against daylight, he could say, that at times it is unusually bright, at other times so dull that it requires to be supplemented by electric light; that if the heat of the sun plays directly upon the window the rooms are at times uncomfortably warmed, and that during certain summer months the room is uninhabitable; if the blinds are drawn to keep out the sun the room is darkened.

It has been said that direct sunlight has a beneficent effect on individuals, but this may be open to question; there is no doubt, however, that insufficient light, either daylight or artificial, has a depressing effect, whilst efficient, well regulated and properly directed light has a exhilarating effect.

The cost of daylight must be considered from many angles. In the average building it may be that the initial cost is practically the same, whether large window space is built in or not, though frequently this demands a change in design. From the heating point of view, however, a window must be considered something of a luxury, for the amount of heat dissipated through windows is very considerable, and as our coal situation gets more acute, this will demand a more careful scrutiny. Perhaps, however, the biggest expense in connection with natural daylight is where wells or daylight areas have to be maintained. This frequently monopolizes a very considerable percentage of the total area of the building, perhaps as much as one quarter or one third of the total already occupied by the building. If one figured the income to be gained from the rental of one third greater office space, it would probably pay for the illumination of this space by artificial light one hundred times over.

It is rather difficult to understand why this antagonism to artificial illumination should maintain its hold. It is not due in any sense to the fact that the cost is excessive for costs of artificial lighting have been reduced many times in recent years. A possible explanation lies in the inadequacy and inefficiency of artificial lighting installations in general. There have been comparatively few engineers who understand the essential details of illumination. The whole problem has been left to the salesman of this or that fixture, who naturally sees in every poorly lighted area an ideal opportunity for the application of his own product. Correct lighting is a big enough problem to demand much more specialization on the part of skilled engineers.

Well Begun is Half Done

The Electric Club of Toronto made a fine start on Wednesday Sept. 27 by opening the 1922-23 season with a full attendance. Some radical changes have been made in the conditions surrounding the operations of the Club, chief of which is the change of location of the luncheon, which is now held at the King Edward Hotel. The price of the luncheon has been increased somewhat on account of the more desirable location, but this did not appear to check the attendance at all adversely. The president for the year, Mr. E. M. Ashworth, was in the chair and in his opening remarks made an eloquent and forceful appeal to the members for their regular support and attendance. He urged them on the double ground of, first, the club's value to themselves through meeting men in their own line of business and becoming, so to speak, an integral part of the industry with which they were connected; and, second, the assistance it would be to the club by having their physical, as well as financial support. He felt that the time spent by the members at their Wednesday luncheons may well be counted one of the most profitable hours of the week.

The speaker of the day was Mr. H. H. Couzens, general manager of the Toronto Transportation Commission and of the Toronto Hydro-electric System, who dwelt chiefly with a phase of the electrical industry that is absorbing a great deal of attention at the present moment, viz:—the necessity for a properly equipped and new electrical building at the Canadian National Exhibition. Mr. Couzens outlined the steps that had been taken by the Electrical Supply Manufacturers' Association which, among other things, had sent out a questionnaire to the manufacturers asking them to commit themselves tentatively to the amount of space they would be prepared to use if a proper building were available. The exhibition authorities require a semi-guarantee from the industry that the whole space of such building would be occupied for a period of ten years, the rate also being approximately set. The questionnaires have not yet all been returned, but already over 20,000 square feet of floor space have been accounted for. Mr. Couzens felt confident that this could easily be doubled and that the industry could readily take care of 40,000 square feet of display area. When we consider that the actual area occupied by the booths in any of the Exhibition Buildings is anywhere from a half to a quarter the total area of the building, this means that anywhere from 80,000 to 160,000 square feet in area would be required, that is, a building 400 feet long and somewhere between 200 and 400 feet wide. This would be one of the largest buildings at the Fair and should occupy one of the most prominent positions.

Mr. Couzens spoke favorably of an idea that had been suggested by Mr. McKay, secretary of the Electrical Supply Manufacturers' Association, namely, that an Electric Home should be built in a quadrangle in the centre of the electrical building. Those who visited the Exhibition this year, and the new Pure Food Building, will understand how this could easily be arranged. In the Pure Food Building there were open quadrangles for lighting purposes of perhaps 30 to 40 feet square. If necessary, this opening could be enlarged and a model Electric Home built in as a permanent feature of the Electrical Building.

The speaker also instanced the drawing power of electric homes in electrical exhibits he had knowledge of in England. Figures had shown that 95% of the people who visited the electrical display were also keenly interested in the special features brought out in the electric home, well-wired and well supplied with household equipment.

The honorary secretary, Mr. T. R. C. Flint, briefly explained the result of the recent poll that has been taken in regard to location of the club and the price of the luncheon, which had resulted, as already noted, in the choice of the King Edward Hotel. The honorary treasurer, Mr. R. A. L. Gray, reported a very substantial balance of money on hand from the previous year's operations.

Mr. Julian C. Smith Honored

The progress of hydro-electric development in the Province of Quebec was the theme of many of the addresses at a complimentary dinner given a few days ago to Mr. Julian C. Smith, vice-president and general manager of the Shawinigan Water and Power Company, to celebrate his twentieth year of service. Mr. J. E. Aldred, president of the company, declared that never had anything been carried out in the field of conservation anywhere to compare with what had been done by Sir Lomer Gouin in establishing the great water reserve which bears his name. The Gouin dam multiplied enormously the natural resources of the St. Maurice Valley, and formed the greatest storage reservoir the world had ever seen. Premier Taschereau said that, in spite of a dry summer, the great reservoir established by the Gouin dam had given to industrial plants below it a uniform flow of 12,000 cubic feet. Continuing he said:

The province dreamt of the day when it would be independent of American coal. Water powers had been developed to only six or seven per cent. of their possibility. When more fully developed the problem would have to be faced as to whether such power should be exported or whether Quebec should say "Come and establish your industries here." He called on the business men of the country to study this question in the meantime.

High Voltage Testing Transformer

The highest voltage testing transformer equipment that has ever been sold is now being manufactured by the Westinghouse company at its main works at East Pittsburgh, Pa. This high voltage equipment is being built for installation in the new high voltage testing laboratory now being constructed on the grounds of California Institute of Technology at Pasadena, Cal. A potential of 1,000,000 volts to ground will be produced by this equipment, its capacity being 1,000 kv.a. or 1340 h.p., at this extremely high voltage. The apparatus will consist of four special 250 kv.a. 250,000 volt testing transformers connected together so that their individual voltage will be added. This arrangement requires that the transformer tanks be insulated from the ground, the insulation increasing as the transformer voltages increase. This will necessitate mounting of the transformers on wooden platforms at various heights from the ground, the last transformer being on a platform approximately 12 to 15 feet high.

Convention of Contractors and Dealers
in Toronto, November 13 and 14

The Application of Electricity in the Manufacturing Industry—7

Shoe Manufacturing Entails the Use of Many Light Machines and Small Motors Are Largely Used—Room for Improvement in the Lighting of Shoe Factories

The use of electric drive in shoe factories is comparatively recent, but notwithstanding, most plants of this type are now motor-driven.

It is a fact that in the application of electric motors to different industries there is always one outstanding, particular feature which makes this sort of drive especially applicable and suitable to that industry. Thus, as has been mentioned in these pages, in pulp mills, it is the economy of synchronous motors for grinder drive; in rubber mills it is the accurate and safe control that is afforded, and in woodworking plants the economy resulting from the application of an individual motor to each machine. There are, however, common advantages that are obtained. Neater arrangement, flexibility of the entire system and reduced costs, are all included in each electrical installation, in any industry.

In the shoe manufacturing industry it may be said that flexibility and ease of operation are prime requisities and electric power fulfils these demands to a great degree.

The possibility of running separate machines, or certain banks of machines, alone, is valuable, in a plant where orders fluctuate and demand runs from infants' soft soled shoes to heavy working boots. Sometimes night work is required in certain departments, and it is apparent that electric drive here affords a great saving from the wasteful method of turning idle shafting.

Factory cleanliness is an advantage of electric drive that increases production and makes for contented employees. in the use of motors, and included therein is the assumption of individual drive or at least group drive, all greasy and oily belting and shafting is done away with. Dust is eliminated to a great extent, and the entire plant is made cleaner and neater. More space is given near the ceilings with the resultant advantage of better illumination and fire protection.

A second advantage lies in the ease of installation of individually driven machines. Shoe factories as a rule are crowded affairs and only the more recent installations are definitely laid out. An increase in business demands the installation of several new machines to be placed wherever space is available, and it is much easier to run conduits to the machine than to extend the line shafting.

Manufacturing Processes

In the manufacture of shoes of all kinds, the processes are fairly well standardized. In some of the plants, however, there will be found machines that are more modern or machines that are designed to do mechanically the work that is sometimes done by manual labor, consuming very much more time. For instance, in one plant, a sole-grader is used that automatically stamps the gauge on them as quickly as they can be fed into it. This labor-saving device gauges all thicknesses of leather in half-sizes and the operator has only to glance at the number and place it in the proper rack. The increasing use of such machines may be directly attributed to the availability of electric power.

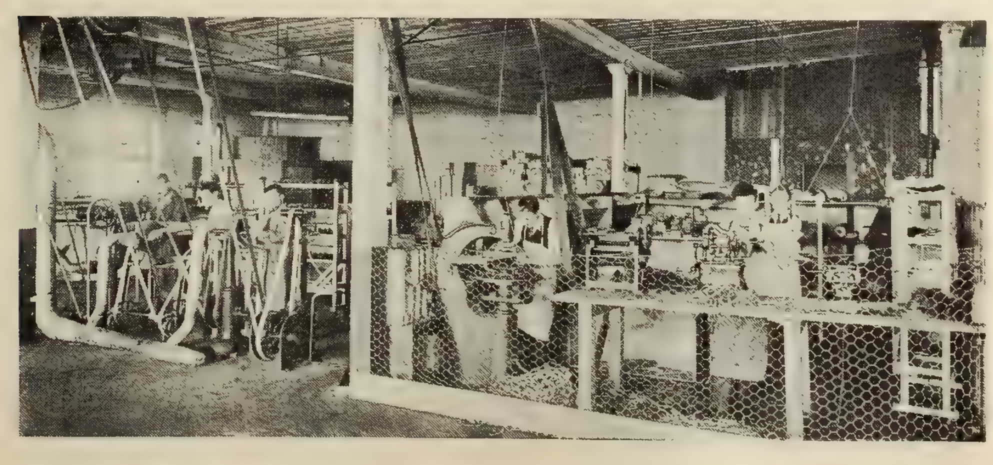
As has been said, however, the process of manufacture for each type of shoe is fairly well standardized.

The Course of a Shoe Through the Factory

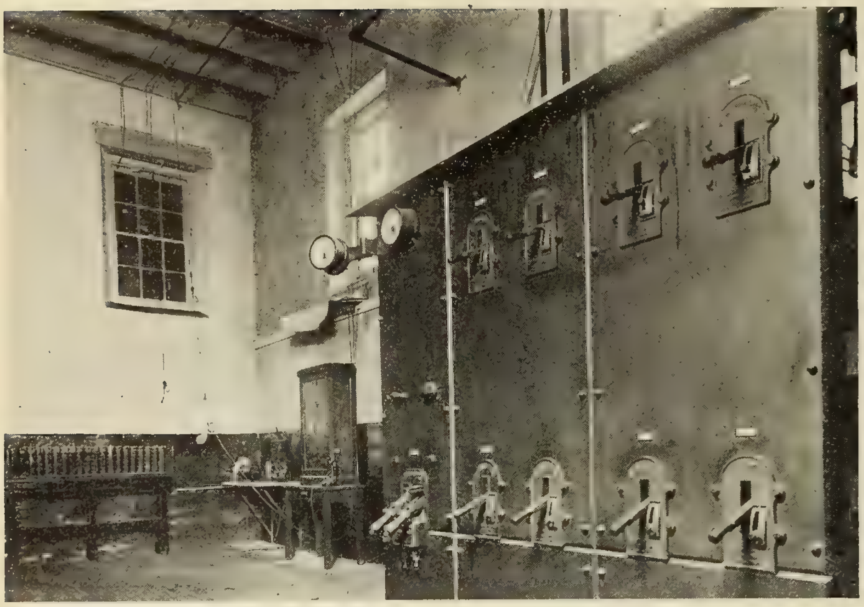
The start of shoe manufacture begins in the "upper" leather room. Here leather is distributed to the operators of the "clicking" machines. These machines are electrically driven and act in much the same manner as a metal punch. They carry dies, which cut out a flat piece of leather of such a shape that it will form nicely around a last to the required shape, i.e., for the upper part of a boot. Even before the days of electric drive, this process was largely machine work, and nowadays it is very rare indeed to find the various parts of the upper cut by hand. The power required for each "clicking" machine is not large; the writer has in mind one plant that runs two of small size from one 3 h.p. motor.

Skiving

After the different leather parts have been cut, some of the edges that will have to be turned or lapped over are "skived" or thinned down to a bevel edge. The edge of the material to be skived is fed to a revolving disc, which cuts it down to the desired level. This machine is also elec-



A department where soles are cut, channelled and breasted by machines. Waste is taken away by an electrically driven suction system.



Distribution board installed in an up-to-date factory. Automatic telephone system shown in background. There is plenty of room left for future extension.

trically driven and consumes relatively small amounts of power.

Perforating

The perforations in toe tips, vamps and wing tips are sometimes made by "punching" machines that cut out the whole design at a stroke. Another way of doing it is to use a "perforating" machine that works in much the same way as a sewing machine. As will be easily foretold by a comparison with the ordinary sewing machine motor, the motors are small, the principal requirement being steadiness of drive.

Cutting Linings

Shoe linings and other fabric parts are cut out by steel dies. Several layers of the fabric are laid out, one over the other, and placed in a stamping machine. The pressure must be sufficient to force the die through the entire thickness of the fabric at one stroke and this naturally requires a fairly powerful motor.

Stitching Department

In the stitching department, the various parts of the upper, whose production we have described, are brought together and stitched into one complete upper. These machines are more or less grouped, that is, driven by one motor for several machines. The motors are generally mounted on the floor, and drive a horizontal shaft. which is laid underneath the frames of the various sewing machines.

The shoe vamps are sewed to the uppers at this point, having gone through a similar process of cutting, and so on. The machines used are almost the same in construction.

Other machines that are included in the stitching department are the "duplex eyeletting" machine which attaches and fastens the eyelets to both sides of the shoe at one time, and the "lacing" machine, which laces the upper with a temporary lacing to hold all the parts in correct position while the sole is being made.

With this operation, the work of the stitching room is completed. The different lots of uppers are then sent to the making room.

Sole Leather Department

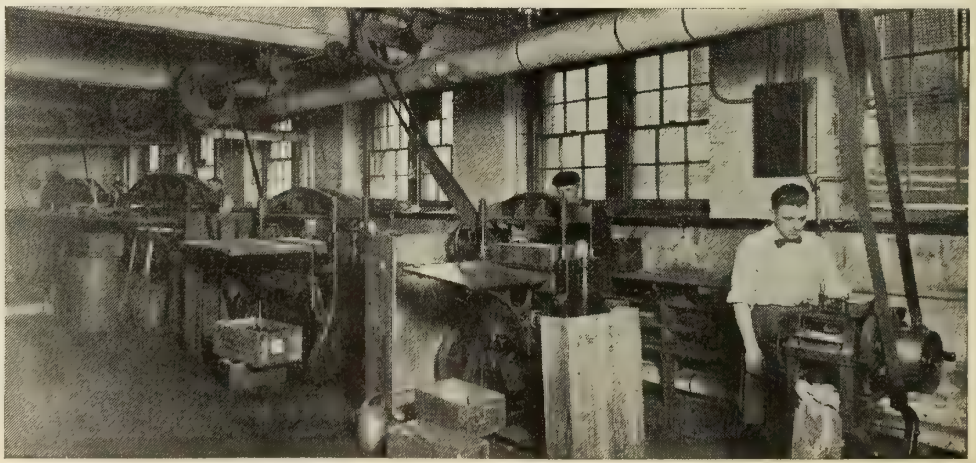
We have now seen the uppers fairly into the making room. All this time the soles and other parts of the shoes are being prepared for the final assembly by different processes. In the case of soles these are somewhat as follows:—

(1) Cut to shape by dies or on "rounding" machine.
(2) Tightened and straightened in "rolling machines."
(3) Reduced to uniform thickness in "splitting machine."

The inner sole and outer sole undergo practically identical processes. The tendency is to group these machines and drive from one motor, a fact which shows there is room for improvement, in the development of individual drive.

Miscellaneous Sole Processes

"Channelling" machines are used to cut two shallow channels around the edge of the inner sole. "Lip-turning" machines turn up the lips of the channels cut in the pre-



A sole-leather cutting room. The machine in the foreground is the grader. The other machines are the dieing machines which cut out the soles and top pieces.

The Bottoming room of a large factory—Here the sole is attached to the upper—Note the number of shoes en route.

ceding operation. The heels are formed from different layers of leather or other material and are cemented and nailed together in a "heel-building" machine.

Assembling

All the parts whose preparation has been described, are brought together in the Making Department. The shoes are here formed upon lasts to the shape that they have been ordered in.

The insoles are tacked to the bottom of the lasts by means of an "insole tacking" machine which drives the tacks automatically. The lining and counter are also secured to the last at this point. The last is then placed inside the upper and put upon the spindle of the "assembling machine." After assembling, which is largely a matter of having the seam at the heel properly placed, the shoe is passed on to the "pulling-over" machine.

The "pulling" machine is generally considered one of the most important in the whole process of shoe making. Its function is to correctly place the parts of the shoe in correct relation to each other, with some slight help from the operator. Tacks are driven to hold the upper securely in position.

Lasting

The assembled parts as attached to the last are now ready for the "lasting" process. There are two different machines for doing this work, the net result of which is to have the leather stretched smoothly over the last and held in position by tacks. All the surplus leather that has been pulled over the bottom of the last is trimmed by a small "trimming" machine. The lasting tacks are removed by a "tack-pulling and resetting" machine.

The operation does not by any means complete the process. It is not our purpose, however, to go into the technicalities of shoe-making to any extent. and it will suffice if a very brief description of the machines is given. Let it be noted that most of these are capable of electric drive, and individual drive—there is much room for improvement in the latter direction.

Here are some of the other machines used:—

(1) Upper stapling machine. Attaches wire staples.

(2) Goodyear welt sewing machines.

(3) Insole tack pulling machine. Draws insole tacks.

(4) Welt-beating machines.

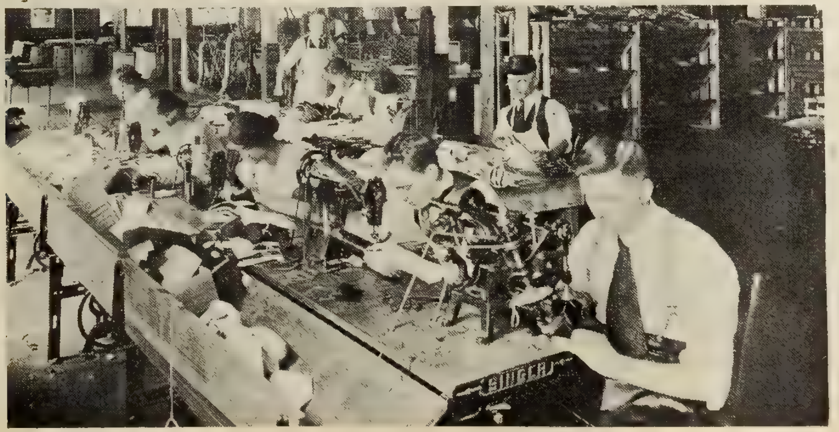
(5) Sole-laying machine. Cements sole in place for further operations.

(6) Rough-rounding machine. Trims outer sole and welt.

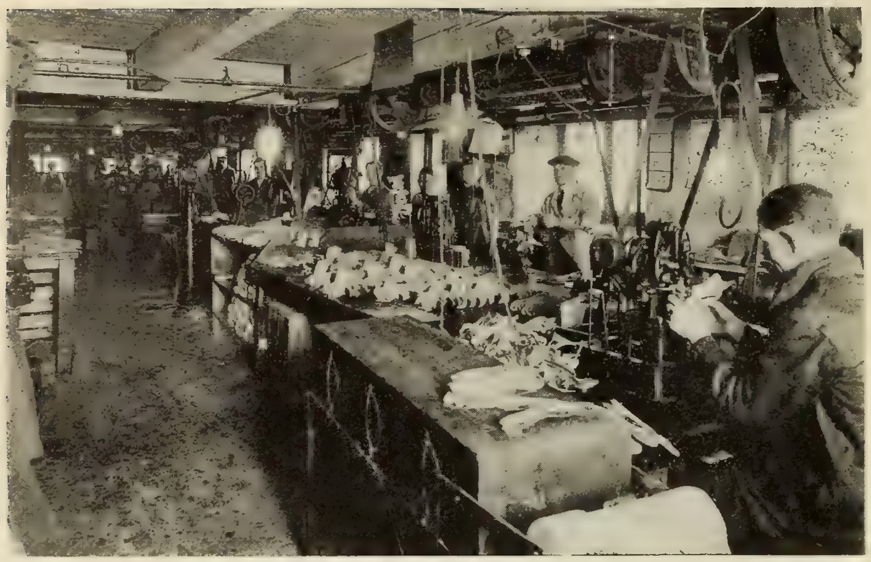
(7) Heel-rounding machine. Rounds heel.

(8) Channel-opening marhine. Opens outer sole for stitches. .

(9) Outside rapid locksmith machine. Stitches outer sole to welt.



A Fitting Department—The fitting of the uppers calls for very delicate hand and machine work. All the machines shown are driven by one slow-speed motor.



A Sole Leather Room—This department is placed in the basement of a large plant. Here the soles are cut, rounded channelled, tempered and so on, placed in boxes along with the counters and sent to the making room—Individual motor drive would do away with the belting shown in the photograph.

(10) Sole levelling machine. Removes unevenness from sole by rollers.

(11) Heeling machine. Nails heel in place.

(12) Heel trimming machine. Smooths back of heel.

(13) Heel breasting machine. Trims front of heel.

(14) Edge-trimming machine. Bevels edge of heel.

(15) Buffing machine. Removes stains and markings.

(16) Finishing machines. Polishes and cleans.

(17) Power stamping machine. Stamps trade mark on shoe.

A thoroughly modern factory includes all the machines mentioned above, and if many different types of shoes are manufactured, the number is greatly added to.

A Typical Factory

One plant that manufactures women's and children's shoes exclusively, uses 160 horse-power. The switchboard and distribution system is right up-to-date, consisting of a Westinghouse switching panel and indicating instruments. A large number of small motors are used, but there is room for many more, as some of these are used for line shafting.

This plant was originally driven by a 30 horse-power steam engine, and the change to its present status is an indication of the progress that has been made in both the shoe and electrical industries.

Another plant, manufacturing men's and boys' heavy shoes, has adopted electric drive exclusively, after 8 years of experience. 125 horse-power is used, and the superintendent reports that very little servicing is required on his equipment.

Some Canadian shoe manufacturing organizations rank among the largest in the British Empire. A Montreal concern runs two factories with a total capacity of 8,000 pairs a day. The total power used is upwards of 1,000 horse-power and included many special applications, such as electrically driven humidifiers, heaters, fans and so on.

Many factories are equipped with suction systems which include a central fan, driven by a heavy motor. A strong draught is required to lift chips of leather and the motor power for even a small plant of this type runs up to 35 or 50 horse-power. Only a small percentage of factories are equipped in this way, and there is a wide field for this application.

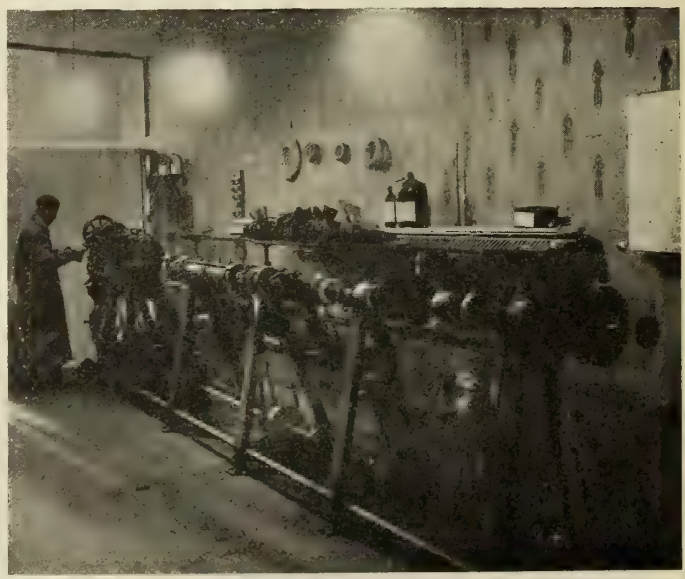
Lighting

Shoe factory lighting is not what is should be. The fault does not lie with the factory owners, as most of them are willing to install the latest improvements of any nature. There are a few plants equipped with indirect units giving desirable intensities, but the majority are "getting along" with a few badly placed drop cords. The possibility of increasing the available illumination by suitable painting of walls, has also been hardly touched upon. The shoe manufacturing industry is peculiarly susceptible to the effects of bad lighting from a production standpoint, as regards rate and spoiled shoes, and it seems certain that there will be great changes in this direction.

A few of the most modern factories are equipped with automatic signal systems, which can call individuals from known departments, or operate general calls throughout the factory. There is a great advantage in this system in time saving, and the provision of these signal systems for shoe factories provides another opportunity for the electrical industry.

Extent of the Shoe Manufacturing Industry

Viewed as a whole, the magnitude of the shoe manufacturing industry in Canada is surprising. The figures speak for themselves. There are over 200 concerns engaged in the manufacture of footwear and the average daily production is well up to 200,000 pairs. These figures are full of meaning for the electrical industry. A daily production of 200,000 requires, counting accessory apparatus as well, about 30,000 h.p. This power is not all electrical—that is the end to be achieved, together with the provision of adequate lighting, protective and signalling equipment. The shoe manufacturing business is as are many others—a fertile field awaiting cultivation by the electrical industry.



The motor-driven machinery of a shoe repair plant

28,000 h. p. Turbines at Great Falls

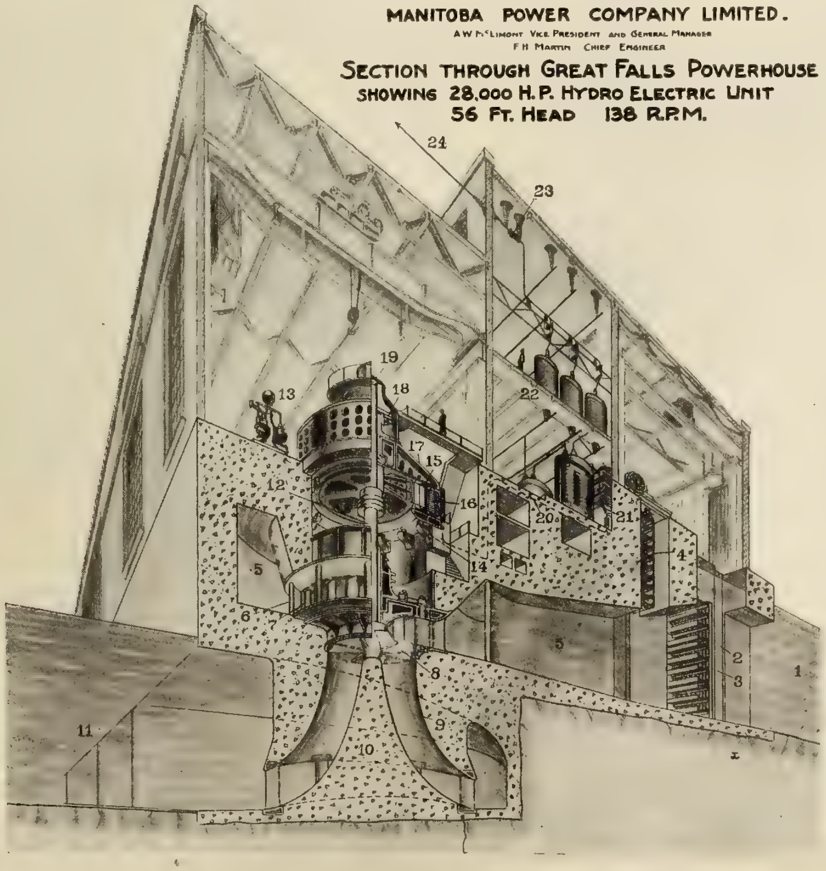
Design Embraces Latest Features of Turbine Development—High Speed Noteworthy—Comparison with Cedais Rapids Turbines

The tendency in the hydro-electric field during recent years has been towards larger turbine units of the vertical-shaft, single-runner type. This has been made possible by the development of the direct connected hydro-electric unit and the satisfactory solution of the thrust bearing problem. With this type of unit, operating under medium and low heads, the question of speed is, for economical reasons, very important. Higher speed means smaller and more efficient generators, lighter overhead construction, and smaller power-house cost. The limit of speed obtainable for large capacity units under low heads has been, and still is, determined by the limits of turbine development. However, great progress has been made by turbine designers within the last few years, and the most striking example of progress is to be found in the new development of the Manitoba Power Company.

Until quite recently the standard turbine runner for low head installations has been the Francis mixed-flow, i.e., inward and downward-flow type. With this type of runner specific speeds around eighty English units have been in use for some time with high efficiencies. Beyond this point, however, progress has been very slow until the recent development of a new type high speed runner, generally known as the "propelled" type,—its name resulting from the close resemblance it bears to a marine propeller. It has three to six vanes mounted on a central hub, and is usually unshrouded, i.e., there is no surrounding band. The new units at Great Falls are to be equipped with this new propeller type of runner.

The new 28,000 h.p., units which are being installed by the Manitoba Power Company, will develop this power when operating under a head of 56 feet, at 138.5 r.p.m., as compared with 75 r.p.m., using the type of runner employed in the Cedars Rapids plant of the Montreal Light, Heat and Power consolidated. The units in this plant when installed eight years ago were of the highest speed type then available. The Cedars units, as originally designed, would develop about 27,500 h.p., and the last units installed in that plant about 28,800 h.p., under the higher head of 56 feet, so that a comparison with the Manitoba units is a fair criterion of the relative merits of the types of runners used in the two installations.

The most striking variations from the Cedars units lies in the design of runner, speed vanes and draft tubes, and the dimensions of the generator. In this turbine there is a much larger whirl chamber between guide vanes and runner vanes. The runner is of the Moody diagonal type in which, neglecting the whirl velocity as before, the flow is diagonal at intake and axial at exit. The speed of revolution of this runner is remarkable,—the circumferential velocity of the vane tips being about 7,000 feet per minute, nearly twice the spouting velocity of the water for a head of 56 feet. This high speed results in a much smaller generator than for Cedars, the outside diameter of the stator frame being only 24 feet and the flywheel effect of the generator rotor 18,000,000 pounds-feet squared. The higher speed also allows the use of a direct connected exciter, whereas separate water-wheel driven exciters are used in the Cedars plant. There is no solid speed ring for this unit. The speed vanes are


MANITOBA POWER COMPANY LIMITED.
A W McLimont Vice President and General Manager
F H Martin Chief Engineer
Section through Great Falls Powerhouse
showing 28,000 H.P. Hydro Electric Unit
56 Ft. Head 138 R.P.M.
24
23
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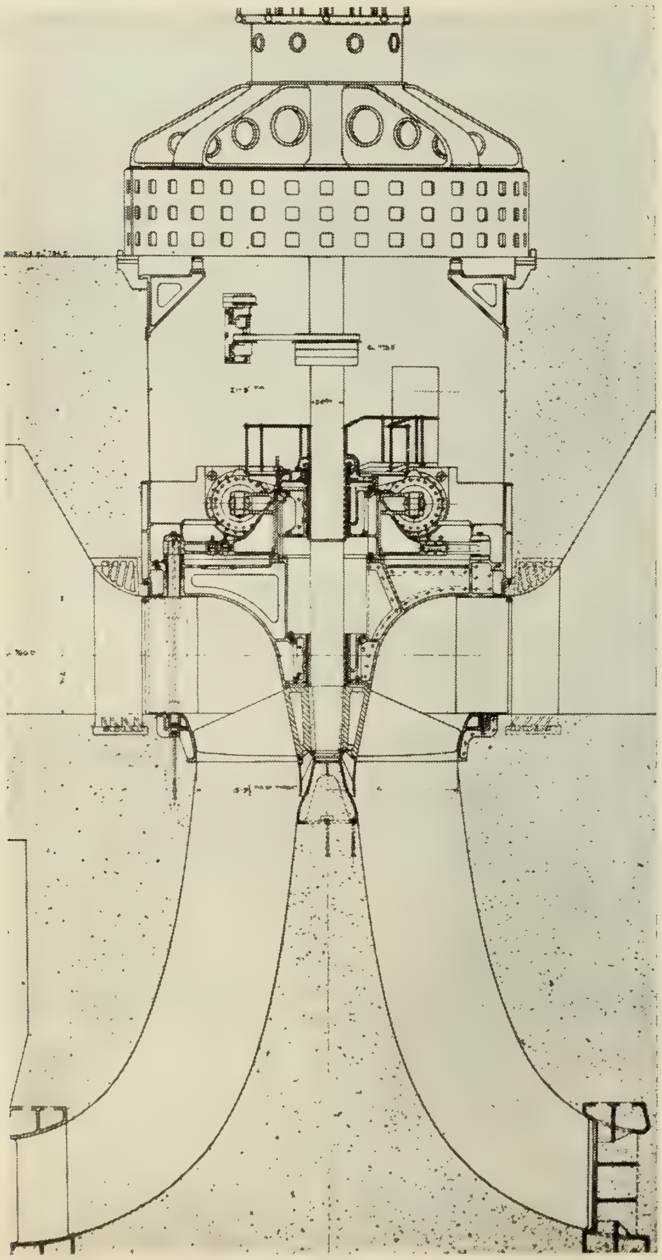
A sectional view of the power house of the Great Falls development for the Manitoba Power Co.

cast separately, the ends being imbedded in concrete and anchored by foundation bolts. The draft tube is of the Moody spreading type with central concrete cone running up to the runner, and with supporting cast iron vanes for the surrounding apron.

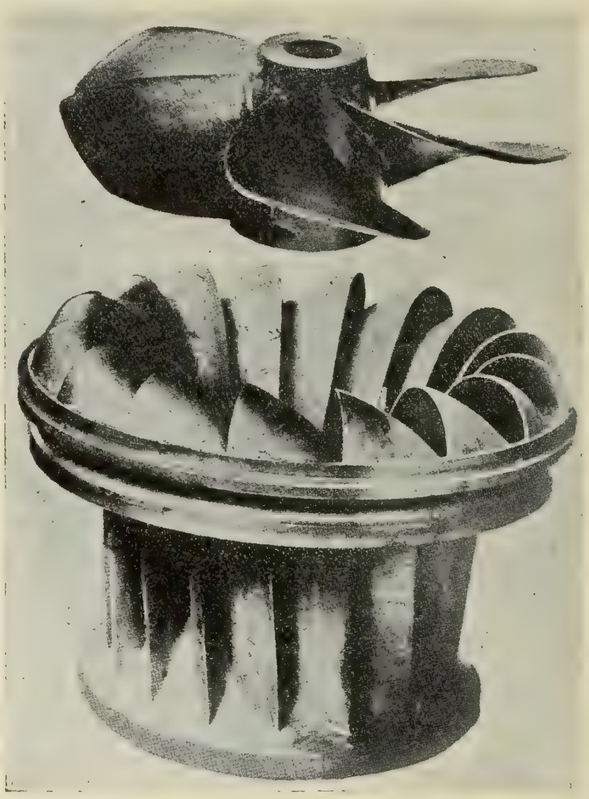
The propeller type runner is very simple as compared to the Francis type. The outer band is eliminated, and the runner vanes have very little curvature, thus cutting down the liability of corrosion. The number of vanes is only six as compared with sixteen for Cedars. This means much wider space between vanes, and little danger of clogging from ice or debris. The intake racks also may be spaced wider in proportion.

Runner Cast in One Piece

The throat diameter of the Great Falls runner is slightly greater than for Cedars, being 189½ inches, but the overall height is only 4 feet 5¼ inches, as compared with 11 feet 9 inches for Cedars. It is made of cast steel in one piece, and the estimated weight is 65 000 pounds, less than half the weight of the Cedars runner. Another advantage of this type of wheel is its great mechanical strength on account of the longer connection between vanes and hub, and the little overhang of the vanes as compared with the Cedars type. The separate speed vanes furnished with their units represent a new style of construction used here for the first time. These vanes are built in with the forms for the concrete, and securely anchored by long foundation bolts. Lugs are cast on the vanes at the top and fitted with adjusting screws for the proper setting of the pit liner with relation to the draft tube ring. This construction means a considerable saving in material and machine shop labor but, on account of the greater erection cost, it will probably only find application in large units of the type under discussion.



Part section of generator, turbine and draft tube



Comparison between Propeller and Francis types of turbine runners

The heaviest casting for this unit is the head cover, which is supported by the pit liner, and in turn supports the lignum vitae bearing for the main shaft. It is built in halves on account of its large size. Its lower surface takes a cone shaped form to conform with the flow lines of the water. The forged steel shaft for this unit is slightly smaller than for Cedars even with the much greater horse-power, its diameter being 24 inches, compared with 25 inches for Cedars. The cast steel guide vanes are the largest yet constructed, their height being 7 feet 1¾ inches and width 4 feet 7 inches. They are fitted with separate stems which rotate in bronze bushed bearings in the distributor plate and head cover, and are connected by levers and double acting shearing links to cast iron operating ring. The shearing links are so constructed that in case of any obstruction lodging between two guide vanes when the gates are closing, or guide vane and speed vane when the gates are opening, the connecting link will shear before any damage is done to the rest of the mechanism.

Special Features of Units

There are other special features of these units which should be mentioned. The guide vane bearings are assured of an ample supply of grease at all times by the use of the Taylor pneumatic greasing system. With this system an air operated grease gun is supplied for each unit with the necessary piping to give a separate lead to each bearing, so that each bearing may be greased independently by a plug cock. The high pressure used ensures adequate lubrication with a minimum of operating labor.

Another feature is the automatic method used for changing from governor control to hand control, or vice versa. This is effected by the use of hydraulically controlled needle valves in the governor pressure and exhaust lines, instead of the old type with gate valves. With the old arrangement two or three men were needed to change the control, but with the new device one man can do so with ease.

The bypass and receiver provided on the governor pressure system is also worthy of mention. This consists of a needle valve discharging a certain quantity of water at all times into a cylindrical receiver connected with the sump tank. The object of this device is to allow constant operation of the pumps without overheating. There is circulation of water through the pumps at all times and the pressure rise is considerably less on account of this bypass.

The total weight of one of these turbines, exclusive of draft tube vanes, governing mechanisms and pumping system is about 630,000 pounds. This reduction in weight from the Cedars unit is largely due to the new type of runner and the separate speed vanes.

The Use of Electrical Appliances by Utility Employees

The slogan "Do it Electrically" is becoming more and more a by-word in the scheme of things, especially in localities where electrical energy is produced on a large scale and distributed at very low cost to the ultimate consumer.

Electrical appliances are manufactured to-day to perform almost every function in the home and factory and the use of these is spreading with remarkable rapidity through the selling effort being put behind them.

Public Expects Electrical Men to Use Appliances

One naturally looks to the central station body for reliable information relating to the operations and economical features of electrical appliances and generally expects the employee with whom contact is made to be fully informed on all the points about many appliances.

It is reasonable to thus suppose that employees of central distributing stations are quite familiar with the various standard appliances, as they would be expected to be the first to equip their homes with such devices. They would wish to become familiar with their operating properties and, secondly, out of loyalty to their employer to advertise the product he has to sell. Such at least was the opinion as regards the employees of Hydro municipalities until a survey was made of the principal ones to ascertain the facts.

Electrical Appliances Used

Cards were distributed to be filled in by employees, to indicate what appliances were being used. Out of 490 cards returned the following appliances were shown to be in use:

Irons	487
Toasters	349
Percolators	128
Grills	133
Vacuum Cleaners	203
Water Heaters	35
Dishwashers	1
Air Heaters	159
Clothes Washers	149
Ranges	105
Refrigerators	2
Miscellaneous	20

These results show that a great deal of effort must be put behind sales to electrical people themselves before we can expect others to accept the theories and sales arguments used to dispose of electrical appliances.

Time Payment Plan Necessary

To further the sale to their own employees, the Commission has instituted the time payment plan on large appliances, similar to that used by most Hydro shops in selling to consumers and every shop will find it necessary, to get the best results, to institute a similar plan if one is not now in operation.

Let every shop begin the task or educating its employees into the full uses of appliances in the home. If we sell the idea to ourselves, our own enthusiasm for promoting the sale of appliances will increase without measure and the public will place full reliance in the sales arguments used to dispose of such appliances to them.

Wireless Controlled Bombs in Next War

An air ministry expert claims that wireless controlled flying bombs, directed with mathematical accuracy from a distant base to their objective, are a certainty of the next war.

After referring to experiments made in the United States, Great Britain and France, with airplanes directed from the ground by wireless, and mentioning that in France recently an airplane, thus controlled, flew nearly 300 miles, he continues as follows: "Wireless control of air craft has infinite possibilities. It means in the near future, we shall have machines that are simply flying bombs directed by wireless. They will consist simply of airplane wings, sufficient to lift the weight to be carried, and an engine sufficient to carry the bomb to the place that has to be attacked. The machine will be fitted with a wireless appliance that sends out repeated signals from which the position of the machine can be judged to a nicety by the directional wireless apparatus. It will be steered with exactitude to its objective and then dropped with disastrous effect. Nothing will be able to stop such a machine except a direct hit from land guns or the shooting away of its wireless by a piloted airplane, both of which will be exceptionally difficult at night.

"There is a possibility that the controlling wireless may be jammed by a defence station, but this is problematical. Tests are now being carried out with the wireless ray which will, when sufficiently perfect, make a wireless absolutely secret and incapable of being jammed.

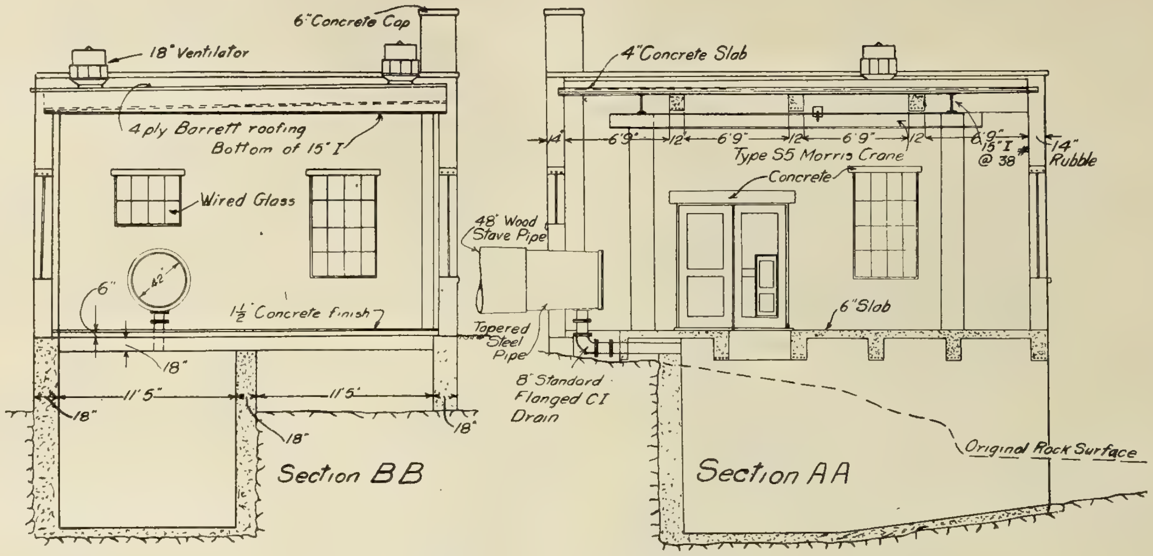
"Great flights of these bombs will be launched in the air under the control of one man. I can foresee a naval battle of the future between on one side, torpedoes and vessels, designed for ramming, controlled and steered by a pilot in an airplane thousands of feet up, and, on the other side a fleet of ships that has to rely on gun fire. The only difficulty of wireless control is that a torpedo ship or flying bomb cannot be steered against a moving object unless that object can be seen. That is why control of the flying bombs or sea torpedoes against a steaming fleet will have to be undertaken from the air."

22nd Annual Convention of Contractors and Dealers

The National Association of Electrical Contractors and Dealers are holding their twenty-second annual convention in Cincinnati, Ohio, on October 11, 12 and 13, 1922.

Hamilton Electric Home Sold

Those who were privileged to inspect the wonderful Electric Home recently shown by the Hamilton electrical industry will be interested to know that the Home has since been sold for $13,500, without furniture but including electric range, two electric mantels and the electric water heater. This Home was illustrated and described in the "Electrical News" of June 15th.



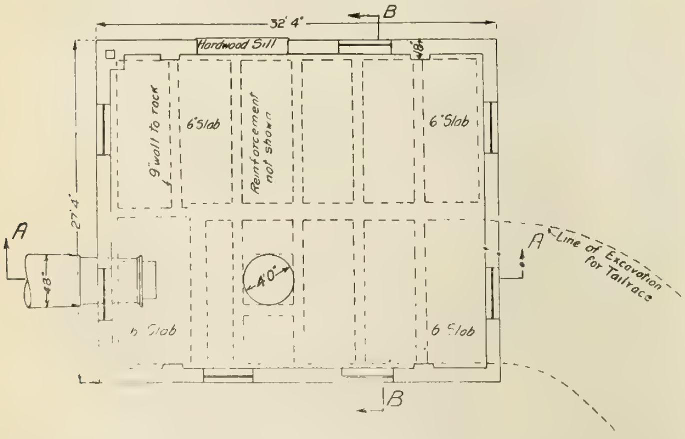
Sections of Thessalon Power House

Hydro-electric Plant at Thessalon, Ont.

The Thessalon hydro-electric power development, located on the Little Thessalon River at the village of Little Rapids, Ontario, is an interesting example of a small development for municipal purposes. Mention of the project has previously been made in these columns, but it is only recently that details of the work have come to hand.

The work entailed includes dam, head works, pipe line and power-house. The dam is of concrete and the use of field boulders, of which a large number are on the site, is allowed. It appears that rock excavation will not be necessary to any considerable extent. The existence of a burned log chute, and an old dam are features that have some bearing on the amount of work necessary by the contractor. A total width of approximately 190 feet is spanned by the dam, of which 62 feet is spillway.

The pipe line is of the wood stave type, 1½ inch thick, of B.C. fir. Guarantees of watertightness of joints at power-house entrance, head works and pipe line itself, for 70 foot head, are required from the contractor. The pipe line is approximately 390 feet long and supports rest on rock. Elevation at dam end is 93.07, at power-house end, 62.0.



Plan of Thessalon Power House

The power-house is to be built 32.4 feet by 27.4 feet, 16.4 feet high. Walls of rubble masonry to roof are specified, with an option of 9 inches hard stock brick. Floor is of concrete with a 1½inch surface coat. Roof is a 4 inch slab, covered with pitch, tarred felt, and gravel. The accompanying illustrations show further construction details.

The contractor is required to furnish 30 stop logs, and 12 logs for the head works. These are fitted with lifting casting, and a hardwood sill is provided at bottom of chocks.

James, Proctor and Redfern, Limited, are the consulting engineers.

First Meeting Toronto Section A.I.E.E.

The Toronto section of the American Institute of Electrical Engineers held their first meeting for the Autumn season on September 29th., in the Electrical Building, at the University of Toronto. Mr. Schnebly, chief equipment engineer of the Northern Electric Company gave a talk on Automatic Telephony. The address was well illustrated with lantern slides.

Radio Inspector for Quebec

Mr. D. McWilliams manager of the Canadian National Telegraphs, Quebec, has been appointed radio inspector for the city and district of Quebec by the Radiotelegraph Branch of the Department of the Naval Service, Ottawa.

Mr. McWilliams' experience dates back to the early stages of wireless in Canada. He served under the Marconi Co. on the Labrador Coast, Halifax, N. S., St. John, N. B., and as officer-in-charge at Quebec for two years in succession. Being a professional telegraphist and a certificated wireless man, the appointment made by the department should meet with general approval.

Experiments with Slide Wire Bridge

Messrs Crompton & Co., Ltd., Chelmsford, England, have published a handbook entitled "Experiments With the Slide Wire Bridge." It is written by Mr. David Robertson, D.Sc., M.I.E.E., Professor of Electrical Engineering in the University of Bristol, and is specially designed for use in the electrical laboratory. Price, three shillings net.

What Does Daylight Cost?

We Regularly Hear About the Cost of Electric Light but Rarely Consider that Daylight Also Involves a Large Expenditure in Capital and Maintenance

By M. LUCKIESH and L. L. HOLLADAY[*]

In the study of lighting it must often occur to some of us that natural lighting costs something, still relatively few persons appear to be conscious of its cost. How often does the consumer of artificial light bring up the question of cost without even hinting of applying this unwelcome characteristic to natural lighting!

In fact many times we have been met with the statement that natural light "costs nothing." This is true quite generally outdoors but is rarely true indoors. Many items contribute to the cost of natural lighting such as the greater cost of constructing windows and roof-skylights than plain walls and roofs respectively; the cleaning and replacement of glass; the greater loss of heat from glass areas than from ordinary walls and ceilings; the valuable wall-space and ground-area consumed by windows and light-courts respectively; and various other factors. Furthermore natural lighting fails at the end of each day and is often inadequate during the day and its distribution in interiors is not often ideal.

But it is not the aim of this paper to discuss the advantages and disadvantages of natural lighting. Such a discussion would lead far afield and would finally become entangled in opinions and speculations. The aim is to compare the cost of natural lighting with that of artificial lighting.

Cost of Natural Light

In estimating the initial cost of natural lighting obtained by means of windows. we include the cost of window-frames, sash, glass, accessories, trimmings, installation and painting, less the cost of wall and plaster replaced by the window. To this initial net cost of window is added the cost of extra radiation and heating system required to supply the increased heat loss of window surface over wall-area. Overhead skylights are treated in a similar manner.

The annual cost of natural lighting includes the interest at 6 per cent on the net initial cost of windows and heating system, net annual repair and depreciation of windows and additional heating system, the cost of washing of windows, and the cost of fuel to supply the additional heat loss.

Strictly the cost of artificial lighting used to reinforce natural lighting in the daytime should be charged to natural lighting thus reducing the costs of artificial lighting and increasing those of natural lighting. This applies to some extent to all interiors but this cost has not been charged to natural lighting. However it is included in the cost of artificial lighting.

We have not included in the cost of natural lighting such items as window-shades, the spoilage and cleaning of interiors and furnishings due to dust and to leaks and various related items. We have confined the maintenance charge solely to the window and sky-light areas.

Cost of Artificial Electric Lighting

The initial investment of electric lighting includes the cost of electric wiring and cabinets, wall and ceiling fixtures, table and floor lamps, shades and reflectors, and other similar equipment.

The annual cost of electric lighting includes the interest on the initial outlay, depreciation and repairs, lamp renewals, and the cost of electric energy.

The cost of artificial lighting includes even those which could be justly charged to natural lighting when the former is used to reinforce inadequate natural lighting in the daytime. This applies to some extent in all interiors, for example in basements and closets of residences, in hallways, in offices, in hotel rooms, etc., natural lighting in the daytime is often reinforced by artificial lighting.

SEVEN-ROOM FRAME HOUSE WITH HOT-WATER HEAT

	Natural lighting	Artificial lighting
Initial cost of installation	$601	$265
Total annual cost of lighting	93	75

Natural Lighting

In estimating the cost of natural lighting in residences let us consider first a modern two-storey frame building, about 27 feet x 30 feet plan, which includes a living-room, dining-room, kitchen, three bedrooms. a bath, hallways, basement, and front and back porches. In this house there are 14 windows 36 inches x 57 inches, six windows 30 inches x 42 inches, and 7 windows 33 inches x 24 inches, or a total of about 288 square feet of window area. The cost per window for these three sizes are $27.75, $17.00, and $10.75 respectively, or about $1.95 per square foot of window. Deducting $0.37 per square foot for weather-boarding and plastering replaced by window, the net costs respectively for each size of window are $22.50, $13.75, and $8.70 or about $1.58 per square foot of window. Since there are 288 square feet of window surface, the initial net cost of windows is $455. According to our estimates and assumptions the interest at 6 per cent upon this initial investment of $455 is $27.30; the depreciation at 2.83 per cent is $12.85; the repairs and painting of these 27 windows per year,. less the cost of painting the weather-boarding is about $6.25; and the cost of washing them four times a year is about $11.50. Therefore the total cost of maintaining them is $57.90 per annum.

According to our assumption of temperature differences and radiation our estimates indicate that 0.283 square feet of additional radiation is required for each square foot of window area to supply the net heat loss chargeable to windows. Assuming the cost of a hot-water system to be $1.80 per square foot of radiation the initial cost of heating system would be $0.51 per square foot of window or a total $146 for the 288 square feet of windows in the house to supply the net heat loss due to windows.

The annual charge for heating these 288 square feet of window area would include interest upon the $146 at 6 per cent or $8.76, depreciation at 3.4 per cent or $4.97. repairs of about $0.82, and the cost of coal at $10.50 per ton when the furnace is operated at half capacity for seven months of the year or about $20.70; or a total annual cost of supplying the heat lost through windows of about $35.25.

On summarizing we obtain the costs of natural lighting presented at the beginning of this section.

Artificial Lighting

In estimating the cost of lighting this house by electricity let us assume first a meagerly equipped home but somewhat above the average as shown by a survey which is now in progress. We assume for this home a ceiling-fixture, two portable lamps, and two convenience outlets for the living room; one ceiling-fixture, one portable and one convenience outlet for the dining room; one ceiling-fixture and one convenience outlet for the kitchen; one ceiling-fixture, one portable lamp, and one convenience outlet for each of the bedrooms; two wall-brackets in the bathroom, one ceiling-fixture and one convenience outlet in the hallway; one ceiling-fixture on the porch; three drop cords in the basement. According to our assumption these represent an initial cost at $5 per outlet of $100 for wiring; $100 for fixtures; and $65 for portables; or a total initial cost of $265.

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[*] Of Nela Research Laboratories, before I.E.S. Convention, Swampscott, Mass.

The annual charge against electric lighting includes interest at 6 per cent on the invetsment equal to $15.90; depreciation on the wiring at 3 per cent., depreciation on the portables at 5 per cent, depreciation on the fixtures at 4 per cent or a total depreciation of $10.25 per annum; an annual repair of $7.90; lamp renewals of $4.35; and the cost of 160 kw.h. of energy at $0.08 per kw.h. or $36.80. Therefore the annual cost of electric lighting is $75.20 according to these assumptions. A summary of total costs is presented at the beginning of this section.

SEVEN-ROOM BRICK HOUSE

	Natural lighting	Artifical lighting
Initial cost of installation	$658	$610
Total annual cost of lighting	111	120

In order to obtain a further comparison of the natural and artifical lighting of residences we have considered a more adequately lighted house. A total window area of 374 square feet is assumed and a more elaborate electric lighting equipment was provided.

Assuming the same conditions as in the previous cases we find the net initial cost of windows to be $486.20. The annual cost consists of the following items; interest, $29.17; depreciation at 2.83 per cent or $13.75; repairs at 2.5 per cent or $12.15; and washing four times per year or $14.96. the total annual cost of windows is found to be $70.03.

Assuming the same heat losses per square foot the initial cost of heating system to supply the net loss is $171.60. The annual cost of supplying the heat loss consists of the following items; interest, $10.30; depreciation $5.84; repairs $0.96; fuel $24.30. The total annual cost of heating system to supply the net heat loss is $41.40.

This seven-room house equipped for adequate lighting is assumed to have the following equipment. The living room contains a ceiling-fixture, one table lamp, one floor-lamp, two candle-lamps and four convenience outlets; the dining-room contains a ceiling-fixture, two wall-brackets and one convenience outlet; the kitchen contains a ceiling-fixture, a drop-cord or wall-bracket, and two convenience outlets; each of the three bed-rooms contains a ceiling-fixture, two wall-brackets, a table-lamp and two convenience outlets; the bath-room contains two wall-brackets and a convenience outlet; each of the two hallways contains a ceiling-fixture and a convenience outlet; each of the two porches contains a ceiling-fixture and a convenience outlet; and the basement contains four drop-cords and a convenience outlet.

The initial investment in this more adequately equipped seven-room house, therefore, includes the expense of fifteen ceiling outlets, ten wall-bracket outlets and 19 convenience outlets, all at $5 per outlet or a total of $220 for electric wiring; it includes $245 for fixtures; and $145 for table and floor lamps; or a total of $610 for electric wiring, fixtures and portables.

The annual cost of the artificial lighting consists of an interest charge of $36.60; depreciation of $23.65; repairs of $6.85; lamp renewals of $5.06. and the cost of 598 kw.-hr. of energy at $0.08 per kw.h. or $47.84 for electric energy. This is a total for electric lighting of $120 per annum.

The summary of costs is presented at the beginning of this section.

FIVE-ROOM BRICK APARTMENT
Steam-Heated

	Natural lighting	Artifical lighting
Initial cost of installation	$225	$230
Total annual cost of lighting	39	65

It is assumed that this steam-heated five-room apartment has only one-hall the window area of the first house considered or 144 square feet and that the electric lighting is meager but representing the average condition.

Using the same assumptions and conditions as in previous cases the initial net cost of the windows is found to be $187.20 and the net annual cost of these windows to be $27.22.

The initial cost of the steam-heating system is assumed to be $1.40 per square foot of radiation. The annual cost per square foot of radiation is computed to be $0.146 including interest, depreciation, and repairs; and the cost of fuel is computed to be 0.28 per square foot of radiation per annum. The initial cost of the heating system to supply the net heat loss of the windows is found to be $37.80. The total annual cost to supply the heat losses due to windows is found to be $11.50.

The summary of costs chargeable to natural lighting are presented at the beginning of this section.

In this apartment there are assumed to be five ceiling-outlets, two wall-brackets, and five convenience outlets which at $7.50 per outlet represent an initial cost of $90.00 for wiring.

An allowance of $85 is made for fixtures and $55 for brackets making a total initial cost of $230.00.

The annual cost consists of the following items; interest, $13.80; depreciation, $9.13; repairs, $2.60; lamp renewals, $3.83; 443 kw.h. at $0.08 per kw.h. or $35.44 for electric energy. This totals $64.80 per year for electric lighting.

MODERN HOTEL; ROOM AND BATH

	Natural lighting	Artifical lighting
Initial cost of installation	$161	$115
Total annual cost of lighting	14	14

We assume a hotel in the down-town section of Cleveland, for instance where real estate is worth $60 per square foot; we assume that the building is 14 stories high; that 13 per cent of the possible floor space is sacrificed for light-courts; that the building is one-storey high above ground on light-courts and covered with sky-lights over one-fourth this area. We further assume that a system of heating and ventilation is installed for washing and heating the air.

Assuming the initial cost of a high-class pressed-steel frame window is $2.50 per square foot, and the brick wall replaced is $0.75 per square foor or a net cost per square foot of $1.75, with interest at 6 per cent, depreciation at 3 per cent, repairs 0.6 per cent, and washing four times per year at $0.01 per square foot the annual cost per square foot becomes $0.208. Assuming a room and bath to have but one 4 foot x 6 foot window the initial net cost of window would be $42.00 and the annual cost of interest, depreciation, repair and washing would be $5.

Assuming an initial cost for the heating and ventilating system of $5.50 per square foot of radiation, and an interest of 6 per cent depreciation of 3.4 per cent, repairs of 0.6 per cent, and fuel at $7 per ton to operate the heating system at half capacity for seven months of the year, and electric energy for the ventilating fans at one-fourth the cost of fuel, then the annual cost of operating one square foot of radiation becomes $0.80. Since one square foot of window is computed to lose a net amount of heat of 44.8 B. t. u. per hour, one square foot of window requires 0.187 square feet of radiation. Therefore the initial cost of heating and ventilating systems required per square foot of window is $1.03; and the annual cost for heating one square foot of window is $0.15. Therefore the initial net cost of heating and ventilating system for the 24 square feet of window surface for a room and bath is $24.72; and the annual cost is $3.60.

Assuming real estate worth $60 per square foot the building 14-stories high and 13 per cent of possible floor space taken up in light-courts, the net cost of real estate per square foot of floor is $0.56. If the room and bath be assumed to contain 168 square feet of floor space, the initial cost of real estate chargeable against light-courts is $94.08, and the annual charge for interest at 6 per cent is $5.65.

The large portion of the cost of natural lighting which is due to the area occupied by light-courts makes this matter of concern. Where land-values are still higher the cost of light-courts becomes even more important.

Summarizing we obtain the costs presented at the begining of this section.

Assuming that we have one ceiling-outlet, two wall-bracket outlets and one convenience outlet in each room, and two wall bracket outlets and a convenience outlet in each bath and allowing $10 per outlet we find the initial cost of wiring to be $70. If in addition to the fixtures there is a table-lamp we assume an initial cost of fixtures and portables to amount to $45 or a total initial cost of electric wiring, fixtures and portables of $115.

The total annual charge will consist of a charge of $6.90 for interest, of $2.27 for depreciation, of $1.18 for repairs, of $0.99 for lamp renewals, and a charge for 65 kw.-hr. of electric energy at $0.04 or $2.60. These represent an annual cost of $13.94 for electric lighting for a room and bath.

A SUITE OF OFFICE ROOMS

	Natural lighting		
	without light-court	with light-court	Artificial lighting
Initial cost of installation	$667	$1,584	$976
Total annual cost of lighting	86	141	290

In such a case as the hallway assumed in the suite, artifical light must be used a considerable portion of the day. This is also true of artifical light in the offices. Strictly, the costs of artificial light to reinforce the natural lighting should be charged against natural lighting. This has not been done but if it had been done the costs of artificial lighting would have been reduced and the costs of natural lighting would have been correspondingly increased.

For comparison of natural and artifical illumination we have assumed a suite of rooms in an office building consisting of six 14 feet x 16 feet offices with three offices on a side and a 7-foot hallway between. We assume further that each room is illuminated by two 4 feet x 5 feet windows and by four 200-watt semi-indirect ceiling-fixtures, and that the air for ventilation is washed and heated before being circulated.

Assuming a net initial cost per square foot of window to be $1.75 and its annual cost to be $0.208, we find the initial net cost for windows in the whole suite to be $420; and the annual cost to be $49.92.

The heating system necessary to supply the heat losses due to windows assume as in the hotel, to have an initial net cost per square foot of window of $1.03; and the annual cost to be $0.15; therefore, the initial cost of heating system to supply the net loss of heat through windows is $247.20 and the annual cost is $36.

Summarizing we find the costs as presented at the beginning of this section.

Assuming four semi-indirect ceiling-fixtures and three convenience outlets in each office and one direct ceiling-fixture in the hall, we have at $10 per outlet, a total initial cost of $430 for electric wiring. Assuming, $22.50 for each office fixture and $6 for the hall fixture we obtain a total initial cast of $546 for fixtures or a total initial cost of wiring and fixtures of $976.

The annual cost of electric lighting according to the assumptions and computations consists of $58.56 for interest, of $21.84 for depreciation, of $9.76 for repairs, of $36.90 for lamp renewals, and of the cost of 4,080 kw.-hr. at $0.04 or $163.20 for electric energy. These represent a total annual cost for a suite of six rooms and hall of $290.26 for artificial lighting.

If we assume, as in the case of the hotel that there be an initial cost of $0.56 per square foot of floor area for light-courts, the initial cost of natural lighting would be increased by $917.28 and would become $1,584.48; and the annual cost of natural lighting would become $140.96.

CONCLUSION

It is the aim of this paper to present cost-data pertaining to natural and artificial (electric) lighting systems for a few representative interiors. In making these computations actual buildings have been used as a basis in each case although in some cases certain minor modifications were made which, in our judgment, made them more generally representative of their class. In the interest of space conservation a vast number of details of computation and estimates have been omitted in the preparation of this paper; however, the chief assumptions and estimates are presented. It should be recognized that conditions upon which costs are based vary considerably but having chosen actual buildings it is thought that the costs presented in the foregoing paragraphs are at least approximate.

It is seen that the cost of natural lighting is of the same order of magnitude as that of artificial electric lighting in all cases.

It is not suggested that we eliminate windows from residences but it is felt that cognizance of the fact that daylight costs are appreciable in residences should make the householder more lenient towards the costs of adequate and proper artificial lighting.

In the case of office buildings, hotels, museums, and other public buildings, especially in congested districts where land-values are excessive, it is seriously suggested that the cost of natural lighting be given greater consideration in general than in the past. Light-courts in many cases contribute a large burden of cost to natural lighting and in many of our offices and hotel rooms they do not provide adequate natural lighting. In other words during many hours of a year artificial lighting must reinforce natural lighting even in the daytime. But in the foregoing sections this has not been charged to natural lighting, but has been borne by artificial lighting.

In many cases windows also contribute much to the cost of natural lighting by utilizing valuable space.

The psychological effect of the absence of windows is well recognized but in our congested cities many persons must work under inadequate, or total absence of daylight. Many night-workers gain little or no advantage from windows excepting the psychological effect of "natural" ventilation. If congestion increases, economic consideration will surely compel the reduction of area of light-courts and of windows and will perhaps eliminate them entirely in some cases.

Artificial ventilation and adequate artificial lighting can supply the actual utilitarian demands. It is easy to prove that many interiors existing to-day would be improved as work-places if the outlay for daylight could be applied to the rehabilitation of the artificial lighting.

In some cases, such as museums, there appear to be no defensible reasons for not eliminating the cost of daylight in some of the rooms while the building is being constructed. Adequate and proper means of artificial lighting can be installed, operated, and maintained at costs comparable with and in some cases even less than adequate natural lighting systems. This plan applies particularly to spaces in the central portion of large buildings, and substitutes for more or less undependable natural lighting, readily controlled modern artificial lighting.

The questions involved in substituting artificial lighting for natural lighting are numerous and complex and a discussion of them would lead us far from the objective of this paper. Some of them have been briefly touched upon to show why we set ourselves to the task of estimating the cost of daylight.

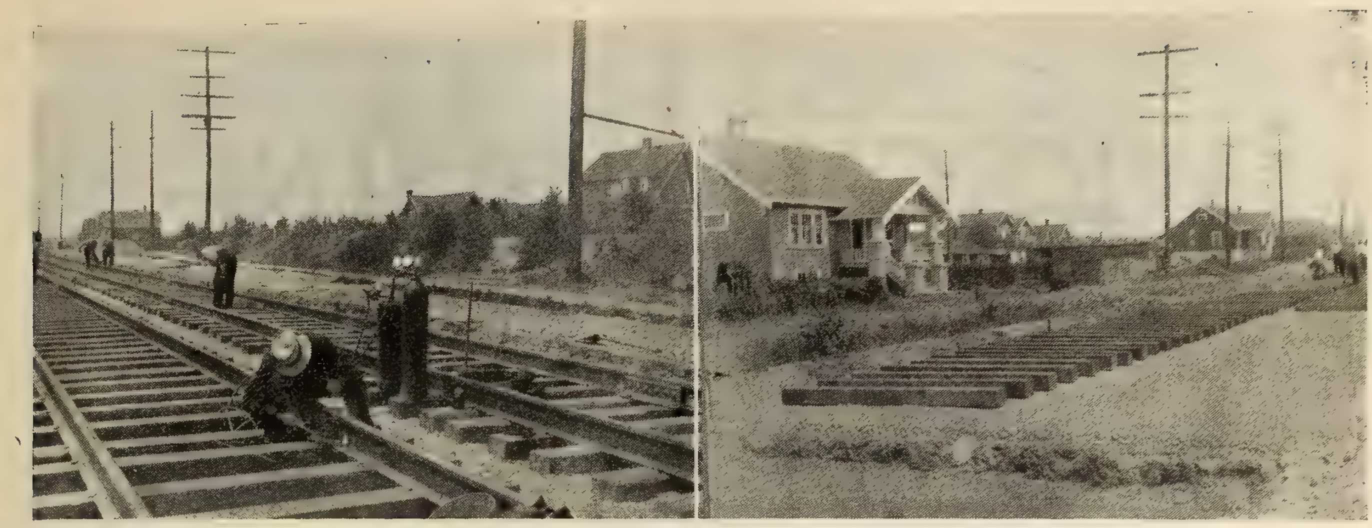
Direct wireless communication from England to Australia will be possible in the near future. Plans to this end are already so far advanced that a site for the large station required for the purpose has been inspected. The proposed station will probably be situated at Bourne, in Lincolnshire, England, and will, it is said, be equipped with aerials a mile in length and half a mile in breadth. The total cost of the station will be over a million sterling.

Mr. Wolsey Accepts Important Office

Mr. R. B. Wolsey has been appointed registrar and secretary-treasurer of the Association of Professional Engineers of the province of Ontario. Mr. Wolsey is an engineer, of varied experience. He received his education and training in English schools, and, later with Mr. Martin, an eminent engineer and architect of Westminster. He came to Toronto 31 years ago and has been associated with a number of engineering firms. Since 1913 Mr. Wolsey has been secretary and acting registrar of the Ontario Association of Architects. He is also an invaluable member of the Engineers Club, where everybody knows and likes him.

Mr. R. B. Wolsey

Canadians who qualified for Hoover "Go-Getter" Convention: Back row left to right, William Crawford, dist. mgr., Winnipeg; J. B. Fleming, dist. mgr., Halifax; S. A. Small, dist. mgr., Ottawa; J. F. Paxton, dist. mgr., Toronto; P. T. Brinsmead, dist. mgr., Regina. Front row, left to right, H. M. Potticary, dist. mgr., Montreal; W. D. Booker, dist. mgr., Hamilton; W. G. Vogt, office mgr., Hamilton; Thomas F. Kelly, div. mgr., Hamilton; R. F. Judisch, prod. mgr., Hamilton, G. T. White, dist. mgr. London, Ont.



Left—Bonding rails by welding. Right—6 x 8 fir ties laid on subgrade of crushed stone chips.

Trackage Extensions on the B.C.E.R. Co's Lines

With the completion of work on the double track on Broadway West, Vancouver, the British Columbia Electric Railway Company, has put into service an extension that is abundantly justified by the fast growing district for which it is provided.

The type of construction adopted was first class, designed to give service for many years to come. The rails used were 8 in. heavy type, designed for use with permanent pavements. The method of bonding was carefully considered, and it was decided that the best interests of economy and efficiency were served by using solid copper bonds, in place of the cable which was formerly the standard. The oxy-acetylene process was employed for the welding, which is well illustrated by the accompanying photograph.

Fir ties were used throughout, of a uniform size of 6 by 8 inches. One of the accompanying photographs illustrates the method of laying these upon a subgrade of crushed stone chips.

A ballast foundation has been used, the consideration being that this method of construction gives maximum flexibility with sufficient rigidity. It is to be noted that this method of construction has won general favor with the larger street railway companies—all intersections of the Toronto Transportation Commission are laid upon this type of foundation.

The fir ties rest upon 9 inches of ballast, commencing with 3 inch stone, and finished with about 3 inches of screenings. The same fine material was used for tamping, after which a course of concrete was run in.

This extension cost in the neighborhood of $75,000, and most of the money was spent in local labor and materials. The cars started running to Alma Road on Broadway West, on Sept. 1st, thus fulfilling a promise made to the city council three months ago. At the present time a 10 minute service is being given, and a close check is being kept on traffic so that the needs of the district will be adequately taken care of.

The management state that the service is only experimental at the present time and that the present arrangements may be subject to change according to the traffic.

Plans for further extensions are being considered with a view to providing direct service for residents of Dunbar Heights. It is stated the company's plans include the extending of the service by way of Dunbar and Sasamat, alternate cars taking these routes and thus giving a 20 minute direct service to the city. In that case both the Sasamat and the Dunbar cars would operate through to the city via Broadway West. It is stated that the management are also anxious to improve the service to West Kitsilano and West Point Grey, as the present routing is not of the best.

Left—Concrete mixing plant, dump bucket with radial arm. Right—Tamping track with crushed chips; concreting plant in rear

BETTER MERCHANDISING

Is This Your $100 ?

Have you any original ideas about a programme for the coming November Convention?

One well-known contractor-dealer makes the following suggestion:

"Let's get away from papers and speeches. Give us some Demonstrations of Salesmanship. I suggest we hold a series of salesmanship competitions—give hundred dollar prizes – appoint competent judges—so that competitors will take the trouble to prepare their parts and rehearse them properly.

"We've been told often enough what to do Let us hear now—"How-To-Do-It."

If this suggestion appeals to you, **drop the editor a line by return** and we'll see that it gets to the Programme Committee promptly. Add any other suggestions that occur to you.

Supplementing the Coal Shortage
Electric Heat to the Rescue!

An Electric Heater in Every Home

The Present Month of October is the Finest Opportunity the Electrical Industry Could Have to Demonstrate its Practical Value in the Home. The Sale of Heaters Means Added Business in the way of Wiring and the later Sale of Many other Appliances

Now or never!

There never was such an opportunity for business as is offered the electrical contractor and dealer during this month of October by the coal shortage.

There is no coal in most cellars.

There will only be 60 per cent. of our regular supply available under the most favorable circumstances.

Don't think this means that people will come to the contractor and the dealer and demand service. Some householders will do this, but many more will need convincing. Besides, electricity will have competitors. There is apparently no shortage of soft coal; there is some coke also; some briquettes; there are coal-oil burners; gas burners and crude oil furnaces. All of these will have sales advocates. And then there is the need for early action. If the houses are not properly wired the heaters are useless—and wiring will take time.

The central stations also must arrange to take care of much of the increased load. Thus it seems that the harvest is ripe to-day—over-ripe indeed.

Many of our contractor-dealers are already on the warpath. They say the game is plentiful, that the houewives are ready to be convinced and their husbands very willing to do anything that will relieve the situation. Here is the way one of our dealers went about it:

An Actual Experience

He first acquainted himself with the actual facts regarding the coal situation. Calling up several dealers he received their assurance that they had "not a pound" in stock —that they had no knowledge when they would have any.

Then he got out his list of prospects.

He knew, in a general way, what the wiring in these houses was like and what appliances they owned. Some of them had one small heater. A number of them had two. A few of them had electric grates. The wiring in most cases was the bugbear—wouldn't carry much of a heating load. So he prepared the following letter to the lady of the house:

Dear Madam:—

Have you got your winter's supply of coal tucked away in your cellar?

If you have, please accept our congratulations.

If you have not, I want you to give me just five minutes of your time to-morrow or Friday to see if we cannot suggest some plan of helping you out with electric heat. No doubt you have thought about it and may have some questions to ask. I shall be glad to answer them.

May I telephone you about it, before I set out?

Yours truly,
John Smith.

These letters went out on Tuesday night, were received on Wednesday morning, digested the during the day and discussed with hubby in the evening. This, at least was the way our dealer figured it would work out and after-results showed that he was about right.

Thursday morning at nine o'clock he sat down to his telephone. The first name on his list was Mrs. J. B. Jones, Tel. S. 368. He called this number and when Mrs. Jones came to the telephone, this is what he said:

"This is John Smith, the electrical dealer on James Street, I took the liberty of writing you about electric heating in your home. If it is quite convenient to you I could call at your house in a few minutes and answer any questions."

And Mrs. Jones replies:

"Yes, I got your letter and talked it over with Mr. Jones last night. He thinks electric heat would be too expensive and besides, he said he thought you would need to do some extra wiring. I hardly think it would be worth your trouble coming up."

To which our friend counters:

"Well, its just this way Mrs. Jones. Electric heating may cost a very little more, but not much, and a great many homes I know of have no coal at all and they are glad to know about electric heating. Many of my customers plan to use electric heaters through the month of October and part of November and even then there may be no coal, or not enough to go around. Perhaps you think it would be more expensive than it really is, and that would be one of the things we could talk about. We can take one of your rooms, for instance, and I can tell you the exact cost of heating it."

In the end Mrs. Jones consents to see him at 10:30 o'clock.

And so it went, down the list. About 50 per cent. of the telephone calls ended the same way. Thus between telephoning and keeping his appointments he was soon as busy as could be. He would make appointments with only four or five in advance and he tried to have them in the same district.

But to follow John Smith on his campaign:

At 10:30 he presented himself at Mrs. Jones house. "I was well dressed and a half decent looking chap" he states modestly "and so I walked confidently to the front door." His conversation with Mrs. Jones, as near as we recall his story of it, was like this:

"Good morning Mrs. Jones. I am John Smith, the electrical dealer who telephoned you about electric heating."

"Good morning Mr. Smith. I hope I have not brought you here on a wild goose chase, for I really don't expect we can do anything, and you would have to see my husband, of course, but the truth is we are really worried about having no fuel. Here it is getting along to October and the evenings are already cold and damp and that cold snap we had last week brought the situation home to us very vividly. You said that electric heating is not so very expensive? Could we heat our whole house? What would it cost? Do we have to buy heaters? I am afraid I know very little about such things."

"I'll answer one of your questions promptly Mrs. Jones" replied our friend. "You cannot hope to heat your whole house in real cold weather. What I can promise you, however, is that you can keep it very comfortable for a month or six weeks until coal arrives in town. Most of us will likely have to be satisfied this winter with keeping only those rooms comfortable that we are actually living in. Electric heating will do this nicely. Even when coal was available last year a number of homes I know of used nothing but electric heaters up to November 1st, or later. You know how dirty the furnace is at any time and how difficult it is to keep the house just the right temperature when it is not very cold outside. The electric heaters handle that situation splendidly. You heat just the room you want and you can shut it off in an instant when the room gets warm enough or when you move to another room. It is partly on account of these savings that we can promise that you will not find electric heating expensive."

I TAKE YOUR WORD FOR IT. WRAP IT UP I'VE GOT TO QUIT SHIVERING MYSELF BLUE EVERY TIME I GO TO BATHE
I RECOMMEND THIS HEATER BECAUSE ALL MY CUSTOMERS SAY THAT IT IS A REAL HEAT PRODUCER—
WHEN I THINK HOW FOOLISH I'VE BEEN ALL THIS WHILE FOR NOT INVESTING IN THIS —
S-S-SURE YOU CAN ITS ONLY ONE OF THESE —
NOT SO FAST — I JUST WANT TO TAKE A LITTLE LOOK AT THAT BUNDLE
ELECTRIC HEATERS THAT KEEP YOU WARM THESE DAYS
HAW' HAW! EXCUSE ME, I THOUGHT IT WAS ANOTHER SORT OF WARMER, AND THEN I WOULD HAVE WARMED YOU PLENTY
HURRAH! HERE'S WHERE WE BEAT THE COAL MAN WITH AN ELECTRIC HEATER
PA-A! IS THAT MY RADIO SET'
IF IT'S AS GOOD AS MY ELECTRIC IRON, I'LL SAY O.K
FOR GOODNESS SAKE, GEORGE, WILL YOU STAY THERE ALL NIGHT
PA-A-A! HURRY UP I WANTS A BATH, TOO
TAKE YOUR TIME THIS IS THE FIRST SOLID COMFORT POP HAS HAD FOR A LONG WHILE, SOME HEATER
Keogy

That grand and glorious feeling

"Oh yes" chimed in Mrs. Jones "what would the use of a heater likely cost us? Suppose we wanted to keep this room we are in now comfortable enough to sit in during a cold evening?"

John Smith makes a hasty estimate of the air volume of the room. It is about twenty feet long, fourteen feet wide and 8 ft. 6 in. high—2,400 cubic feet roughly. He figures that a half a watt per cubic foot will keep this room comfortable up to the real cold weather. i.e. 1,200 watts. At two cents per kilowatt-hour this amounts to 2.4 cents per hour. So he explains to Mrs. Jones:

"It would probably not cost you any more than two and a half cents to heat this room up nicely. Then you could either turn the heater off or keep it on as long as you liked. You would likely never need to use it longer than two hours of an evening. The total cost would then only be five cents."

"Five cents" echoed Mrs. Jones "five cents to keep this room comfortable all evening, surely that is a mistake."

"No, Mrs. Jones, I can promise you that will be ample."

"Well that is very much less than I expected. And my husband will be very much surprised too. We should have to buy a heater, shouldn't we?"

"Yes, but that too is probably less expensive than you expect. If you want a nice mantle type they run into more money naturally as they make a very attractive decoration. Nothing is cosier than a warm glow in the fire place, but there are other types, quite as efficient. I could show you a heater to do what I spoke of just now for blank dollars. Mantle type heaters cost all the way up to blank dollars. Would it be too much trouble for you to drop into my store sometime during to-day and see the different types."

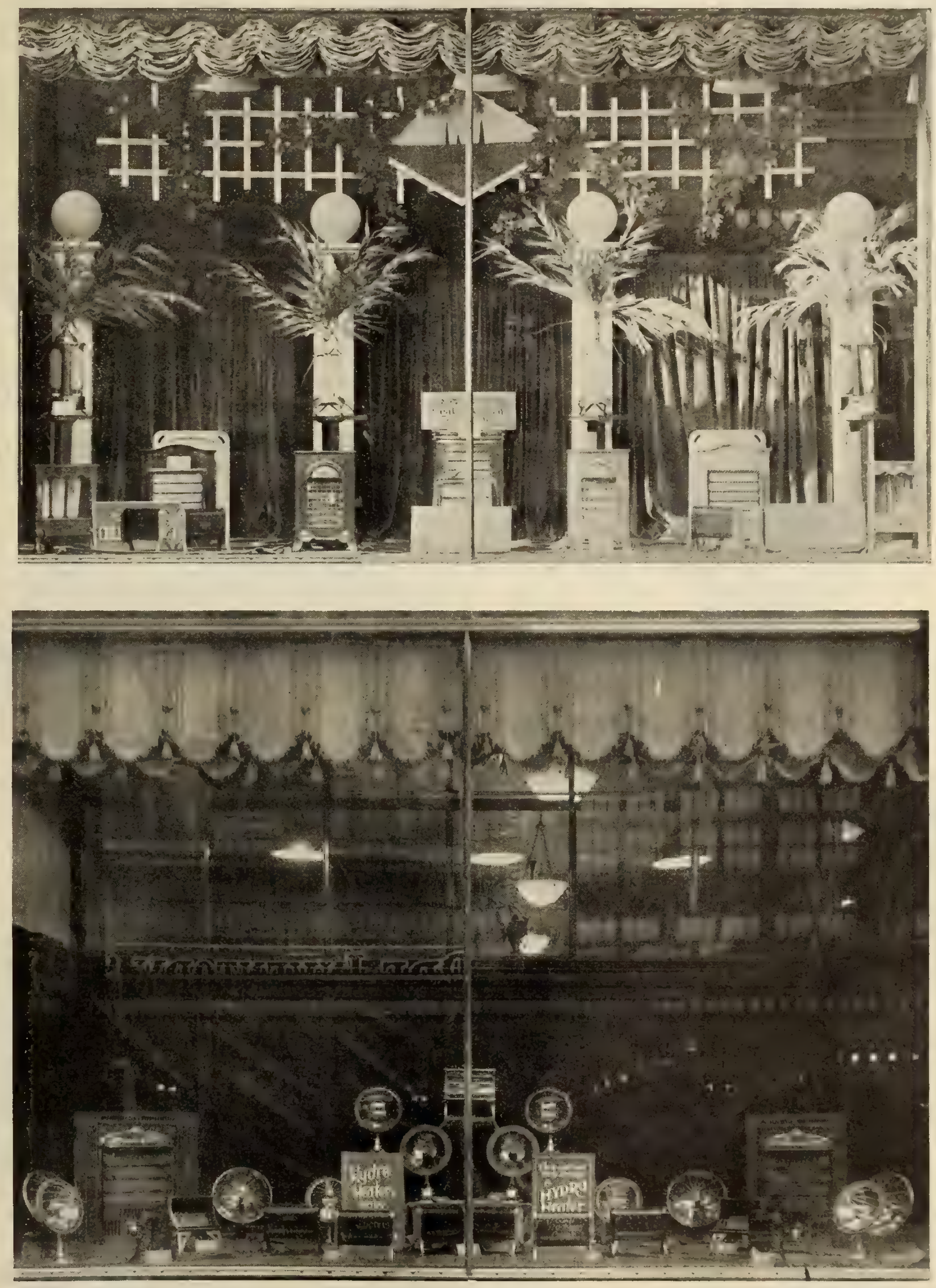
Arrangements are finally made for a store appointment as Mr. Jones is on his way from the office in the evening, Mrs. Jones being anxious that her husband should be present in making the inspection.

"Now I want you to notice" said our friend the dealer in speaking of this incident to the writer "that Mrs. Jones has not been asked to commit herself definitely to buying a heater. I have just taken that for granted and in the end so does she. Many sales are lost by a premature attempt to get a definite committal, to get the name on the dotted line, so to speak, when much better results could be obtained by assuming your customer's consent.

"Another thing I want you to notice" continued this dealer "is that I had not said a single word about wiring the house yet. That was carefully planned on my part. As it happened in this case Mrs. Jones had not raised the question, but if she had I should have sidetracked it as soon as possible. My aim was to get Mr. & Mrs. Jones to the point where they visualized a nice cosy electric heater in their living room, with the temperature just right, Mr. Jones in his easy chair over his pipe and his evening paper and so on. He was not interested in electric heaters as such or in electric wiring. He and Mrs. Jones wanted warmth, color and comfort and that is what I bent my efforts towards selling them."

Mr. & Mrs. Jones selected their heater—two of them in

Are Your Windows on Your Sales Staff?



Window Displays That Put the Message Across fact, a mantle type and a cheaper one. "They were becoming quite enthusiastic said Smith "and Mr. Jones asked if I could send them up right away."

The crucial moment had come.

"I am not just certain about the wiring in your home Mr. Jones," began Smith "When I was up there this morning the thought occurred to me that it may be necessary to put in larger wires in one or two places. You get rather better results from your heater and you know, of course, that if you overload an electric circuit the fuse blows out and has to be replaced. I don't think I could let you have electric heat to-night but perhaps by Saturday night it could be arranged. How would it be if I bring up the heaters to-night and look over your wiring?"

"Thus" said our dealer "step by step I led them along. I knew from the first that this house would have to be practically rewired but I did not think it wise to tell them so. However, the whole thing came out in the evening when I delivered the heaters. We put the mantle heater in place and it just looked "great," Mr. Jones said. I felt then that it was safe to take up the matter of rewiring."

"This is not an exceptional case" said this dealer "it is merely typical. It takes time, of course, but I get paid for my time. By going about the matter systematically and diplomatically Mr. Jones was finally brought to see the necessity for entirely new wiring. I was able to show him that this would cost very little more than a make shift job as in any case it was necessary to put in a larger stand pipe and heavier service. Consequently he may as well make arrangements for using an electric range and water heater."

"The proof of the pudding is in the eating," concluded Brown. "We have already finished wiring the house and they are using both their heaters and getting more pleased with them all the time. In a few days—after the end of the month as a matter of fact, for Mr. Jones is a salaried man—they are coming in to see a range and I have no doubt I shall sell them one. They already have a toaster, vacuum cleaner and one or two other things, and my next effort will be a washing machine and then an ironer or a water heater. I have figured this thing out very carefully and shall be much disappointed if I don't do business with the Jones family, before the year is out, to the extent of five or six hundred dollars. The wiring came to almost two hundred."

"How many such prospects as the Jones' have you on your list, friend Smith?" ventured the writer.

"We have four hundred good prospects in mind," said Smith, "not all as good as Jones, though fifty to a hundred of them ought to be. I am going to do fifty thousand dollars turnover this year—twice what I did last year—and the coal situation has made it all possible. I may have a cold house myself this winter but it will be some satisfaction to have a warm bank account."

The Electrical Dealer Has Plenty of Effective Ammunition

There are still a few people who dream of the day when Niagara Falls and similar sources of energy shall be fully developed and the necessity for importing coal for heating our homes shall be done away with. Once and for all this dream should be answered.

Let us make a simple calculation. Toronto has a population roughly of 600,000 people. Counting four people to a home there are 150,000 homes. Counting the average air volume per house as 10,000 cubic feet we have in all 1,500,000,000 cubic feet.

The next question is, to determine what amount of electric energy is necessary per cubic foot.

Sometime ago the Electrical News published figures of an actual heating installation at Seven Falls, Quebec, where the temperature outside went as low as Zero, and as high as 55 degrees, during the month of March. The temperature within doors during this period never went lower than 58 degrees, and the highest amount of energy used never exceeded 1.52 watts per cubic foot of air space. That is, during one of the coldest months' of a Canadian winter, the temperature of a house was kept above 58 degrees, invariably (on only 5 days was it below 65 degrees) with a maximum capacity of 1.5 kilowatts per cubic foot. This same installation during February has used 1.75 watts per cubic foot, and the conclusion drawn from these figures is that two watts per cubic foot would take care of all weather requirements.

Now going back to our estimate of space to be heated in the City of Toronto, we have 1,500,000,000 cubic feet. At two watts per cubic foot this means a demand on the coldest days of three billion watts, (3,000,000,000) or three million kilowatts, (3,000,000).

The Power of Niagara

It has been variously estimated that if all the water in Niagara River could be utilized at the total head between the two lakes, we should be able to develop about five million horsepower, (5,000,000, h.p.) To date there is only something like one million horsepower available. Supposing, therefore, that all the power now being developed at Niagara Falls, both on the Canadian and United States sides, was withdrawn from present use, and concentrated on heating homes of Toronto citizens, there would be not more than half enough to go round when the cold weather came.

This is unfortunate, but it is a fact. It is no reason, however, why we should not use Niagara power when we can get it. When all our industries are satisfied, and there is a surplus over, there is no earthly reason why we should not use it to make ourselves comfortable. At the present time Ontario is happily situated, in that Chippawa provides a considerable surplus for industrial requirements of the moment. By Christmas this surplus will very likely amount to 100,000 kilowatts. In a recent issue we estimated that the Ontario Commission could probably take care of 150,000 one kilowatt heaters, when they get their fifth generator in operation.

One Heater to Every Four Homes

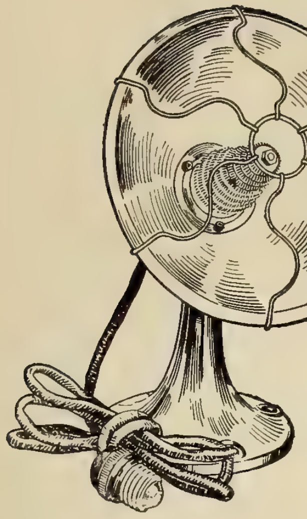
150,000 heaters may seem quite a number to sell during the month of October, but it only means one in ever home in Toronto, or one in every four homes in Ontario.

We have merely taken the Niagara case as an example, because at the moment there is a large amount of surplus power in prospect. The same thing is true in a number of power centres at other points, but not, of course, to the same extent. It is evident, therefore, that at many points in Canada there is much work for the electrical men during the month of October.

One-half Kilowatt per Cubic Foot

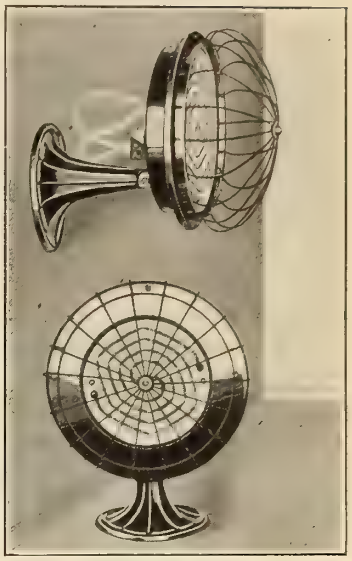
The figures given above with respect to consumption, apply, of course, to exceedingly cold weather. Such large capacities would not be necessary during the months of October and November. Indeed, it would probably be per-

DEFYING THE COAL SHORTAGE



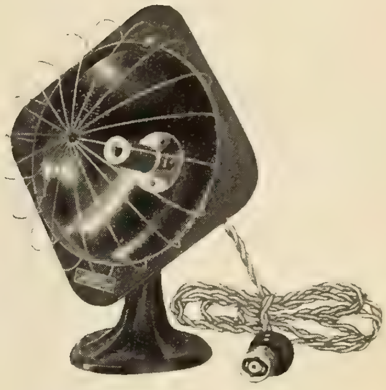
The Great West Elec. Co.; ready for the Prairie blizzard

The National Heatray; the unit screws in and out just like a lamp bulb

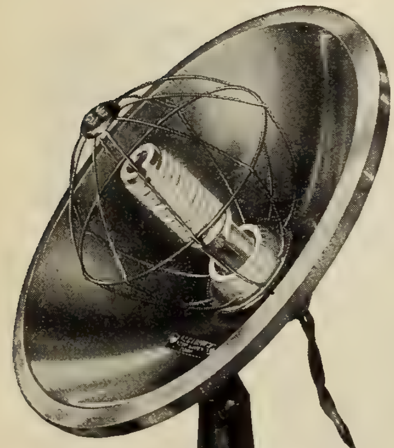


Heavy Duty Hotpoint; 1000, 1500 and 2000 watts capacity

An attractive 'National' mantel type



The Hotpoint Hedlite—Can. Gen. Elec. Co.



Gilbert-Menzies Polar Cub; a popular priced heater

The Equator Mfg. Co's concentrating type heater

The Cosy Glow—Can. Westinghouse Co.

fectly safe to guarantee that our houses could be kept comfortable on consumption of one-half watt per cubic foot. If people will school themselves in patience, smaller capacities than this will be sufficient. Whatever the reason is, however, the average householder expects to get immediate results from his electric heater, and if after about five minutes he is not in perspiration he is apt to condemn it as "slow." It might be a good idea to point out to such people that it is generally four or five hours after the hot water furnace is started up before the house is comfortably warm, ant it is unreasonable to expect instantaneous results from electric heat, though it might also be pointed out that they are much quicker with an electric heater than with any type of furnace.

More Heaters of Smaller Capacity

We want to suggest, therefore, to contractors, that they endeavor to sell and install more heaters of a smaller capacity. We suggest for instance that it would be better to sell three 1,000 kw. heaters in the same home than one unit of 3,000 kw. or even two 1,500. We may even go farther and argue that five units of 600 kw. would serve the purpose of the householder better. There are many reasons why we advance this argument. To begin with, the larger number of small units will provide a better load factor on the central station lines. Even if the larger units are provided with a 3-capacity switch, experience shows that they are operated almost entirely at the higher capacity. Then, with the smaller units the load is more evenly distributed throughout the house, and the wiring is not subjected to such heavy demand at isolated points. From the consumer's point of view it means that he can keep two or three rooms reasonably comfortably, instead of all the family huddling in one room, which is likely to become uncomfortably warm and badly ventilated. The selfish view point is that a large number of heaters will net the dealer and manufacturer a little more profit. From the central station view point a small heater is more satisfactory, because the tendency is to operate one unit for a longer period rather than a larger unit for a shorter period.

As Auxiliary Heat

The dealer should also make much of the argument that electric heat is ideal for supplementing other heat supply during particularly cold weather. Any householder knows that his furnace is a size or two larger than he needs, except for about two or three days in the coldest winter weather. He is forced to make the added expenditure as an insurance of comfort and safety during these peaks. It should be pointed out to the man who is building a home or installing a new furnace that electric heat will supplement his furnace and take care of his surplus demand at a lower cost than would be involved in putting in an unduly large furnace and operating it at low capacity throughout the whole winter. In a word, electric heat enables one to install a furnace in his home of the most economic capacity and operate it at its most economic rating, throughout the whole winter.

And then the Wiring Jobs

How often do we hear it said that, electric heaters are easy enough to sell and electric ranges are easy enough to sell, but the homes are not properly wired for them; right here then, seems to be the opportunity the contractor has been waiting for. In the past the householder was in a position to say, "no, I won't buy a heater, because the wiring for it would cost me too much." Today, however, he is in this position where he says, "I have got to have a heater, so I suppose there is no way out of it; come down and wire my house for electric heating just as quick as you can." It looks like the most wonderful opportunity the electrical contractor has ever had, and we trust he is preparing to take the fullest advantage of the opportunity.

The Contractor-Dealer

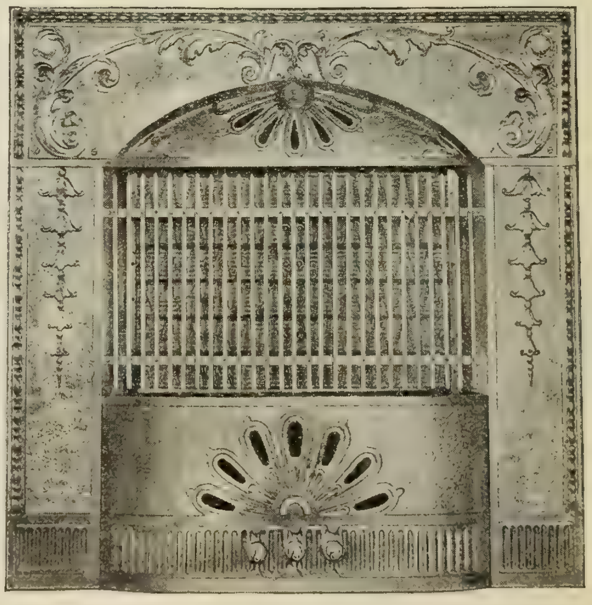
It does sometimes seem, as if everybody likes to take a crack at the contractor-dealer, and say how slow he is and how badly he manages his business and what a poor merchandiser he is, and lots of other hard things, but we believe he is going to rise to his opportunities this time. Manufacturers are backing him up and turning out heaters and auxiliary equipment at a greatly increased rate. Just at the moment we hear of a demand which exceeds the supply, but that is largely due to the fact that demand held off a little too long and has caught manufacturers with too limited capacity. This capacity is being increased, however, very rapidly, and we believe the dealers and contractors may rest assured that they may go ahead with there best efforts, and that the manufacturers will be able to make delivery both of materials and heaters, practically as required.

The results of these campaigns are going to be far reaching. The rewiring of a home if it is properly done, will mean much more than the sale of a heater or two. Next will come the range, then a water-heater, ironing machine and so on. In addition, the moral effect will be favorable if the electrical industry helps people out in a tight pinch. They will feel kindly towards it, and will be much more easily induced to buy the numerous labor saving devices. We should do as much as possible during this campaign to make householders enthusiastic for the electrical method of doing everything about the home.

Wiring Scottish Rite Cathebral

Messrs. Culley & Breay, electrical contractors, have been awarded the contract for the wiring in the Scottish Rite Cathedral, Hamilton, which will be one of the finest Masonic temples in Canada. Messrs. Culley & Breay are installing a quite elaborate electrical system, including a stage switchboard with dimmers, etc., border lights, prescenium strip lights, etc. There will be fourty-three switches on the stage switch-board with four master switches; also a bank of dimmers for dimming the colored lights, which will be installed throughout the building.

Saskatoon, Sask.



A "National" Mantel type heater

Putting "Pep" Into Your Heater Sales and Money Into Your Bank Account

A Large Percentage of Wired Homes do Not Own Electric Heaters—Some Hints for the Merchant

Of the thousands of homes that are wired for electricity, only a small percentage have electric heaters—5 per cent is a conservative estimate. With the present coal shortage, the remaining 95 per cent are fine prospetcs for heater sales, and right now is the time to go after them. Any electrical dealer can initiate a heater campaign with confidence, at the present time, and he will find that they will move with the minimum of sales effort.

Heaters can be retailed at prices within the reach of the average salaried man—in fact, every man that lives in a wired home is a prospect. Mr. Common Person does not have to mortgage his home, or tie himself up to an installment plan that looks like a life annuity scheme—he has just to hand over a fraction of his month's salary and the complete supplementary heating unit is his.

The smaller units are going to be sold in the greater numbers but at the same time they should not crowd from the dealer's mind the higher wattage heaters and the electric grates.

If Mr. Well-fixed ever had an idea that he would like an electric grate in every bedroom in his house, now is the time he is likely to feel most willing to put the idea into execution, and his neighbor will probably emulate him, by putting in a service that will take care of any heating or cooking load he wants to put on it.

These people are not going to part with their money till they are asked for it, however, a certain amount of push has to be used, and a heater campaign should begin with the advertising.

Advertising

Electric heater sales talk and advertising should not deal to any extent with the mechanical features of the device. The metals used in construction, the wire used in the element, the method of finishing,—these things are not the best selling points—they are interesting to a percentage of your customers that are educated on electric heaters, but these are a very small fraction of the whole. What counts are facts that have a wide general appeal, that attract people who don't know whether an electric heater is assembled or cast all in one piece, and don't particularly care. These are the great majority of buyers and effective selling talk must cater to them. It is best to talk of the advantages of the electric heater generally its portability, ease of operation, the possibility of having the heat exactly where desired, and so on.

Here is an appealing bit of copy:

Glowing Heat—Where You Want It

"Either to cheer the worker who must start to his task in the cold grey dawn. or to comfort the kiddies at their bed-time hour, the electric heater is supreme—an abundance of glowing heat with the turn of a button.

"Moveable anywhere, always ready for instant use, this handsome heater will have a thousand uses in any family. It is easy to keep smart and clean, and the polished reflector puts the heat where you want it.

"The worry of running furnace fires in mild weather is eliminated—no tinkering with grates and coal—and the heat is just where you want it, not all over the house. Think of the economy!"

That is the sort of ad. that gets across to the man who hates getting up on cold mornings and to the woman who is worrying about the difficulty and dirt in operating furnaces in mild weather.

Window Trim

When putting heaters in a window remember that the idea is to display them—to bring out the points that you would emphasize most if you were talking to the customer. The most effective window display is that which exhibits a single idea—the single idea is more easily assimilated by the passerby, and is better retained in his memory.

A window containing a great number of articles has not a striking effect, as generally the articles have no relation to each other, and with such a window customers may pass by, perhaps just after a change has been made, without noticing it.

Undoubtedly the thing to do is to concentrate on one idea. The window dresser should have special aptitude for his work, and be allowed time to fix up the window in decent style. Considerable time and money are well spent, when it is estimated that from 30 to 50 per cent of store sales are made from the side walk through the medium of good window displays.

Here are some other window points:

(1) Use high, opaque window background to keep the view only for those outside.

(2) A window floor sticks up prominently; keep it clean.

(3) Keep the windows lighted at night.

(4) Use showcards of the right kind, with the right talk.

The Mailing List

You can't be sure that your prospects are all going to pass your window when the electric heaters are in it, nor that they will read the newspapers the day your local ad. appears therein. But you can get them with a letter—outline the idea of your sales campaign in plain, understandable English and see that you reach everybody on your mailing list. The letter must interest the women, of course. and for that reason its main point must be what the heater does for the housewife.

Personal Calls

The circular letter should be followed by a salesman to close matters and it should be emphasized right here that this is the clinching point in the campaign. The advertising, the window display and the circular letter are but the preliminaries, and they are liable to fail utterly without the follow-up of personal contact.

What Can be Accomplished

A dealer should sell every one of his regular customers who does not at the present time own a heater. He can sell every wired home in his vicinity with a little extra push. That 95 per cent is a great field to work on, and it will yield a fine harvest to any dealer who cultivates it intelligently.

Exhibitors at First Radio Convention

A "Get-Together" of Wireless Enthusiasts That Indicated Wide Extent of the Field in Canada

Canada's first radio convention and exhibition was held in the Prince George Hotel, Toronto, on September 8 and 9. A number of booths were established in the banquet hall of the hotel and hundreds of visitors saw the displays and attended the lectures which formed part of the convention programme.

The convention was arranged under the auspices of the Wireless Association of Ontario, and managed by A. H. K. Russel, president of that body. A joint session was arranged with the Ontario division of the Americal Radio Relay League.

The programme of the convention was as follows:—

Friday, September 8th

Morning Enrollment of Delegates.

2.30 to 5.00 p.m.—Opening of Convention and Address of Welcome to Delegates.

Joint Session of A.R.R.L. (Ontario Division), and W. A. of O.

7.45 p.m.—Dr. Cartmel, Northern Electric Co., on "Vacuum Tubes, Their Operation and Construction."

Mr.. Campbell demonstrated new Northern Electric Receiver and Loud Speaker.

9.15 p.m.—J. H. Thompson, Chief Engineer Marconi Co., "Long Distance Communications."

Saturday, September 9th.

2.30 p.m.—Dr. Chas. A. Culver, Canadian Independent Telephone Co., on "Reception Systems for Radio," demonstrated with working models.

4.15 p.m.—K. B. Warner, on "A.R.R.L. and Its Aims and Aspirations in Relation to Canada."

7.00 p.m.—Banquet.

The latest types of equipment were on view and the exhibition hall was crowded with curious fans. The booths were arranged as below:—

Radio Devices Ltd.—The feature of this exhibit was an aluminum panel, two stage set, for which no body capacity was claimed.

Radio Manufacturers & Distributors Ltd.—A special showing of a 3,000 ohm Dictograph headset was made. Complete sets and parts were also exhibited.

Powley & Moody.—Condensers, head phones, receiving tubes and many parts attracted attention. Products of the Mullard Radiovalve Co., were a feature.

Canadian National Carbon Co.—A pleasing orange and black color scheme was worked out in this booth, which displayed the Eveready Radio Battery.

Perkins Electric Co.—Special attention was directed to Amrad radio products. Several complete sets were shown.

Dominion Battery Co.—This booth was shared by the Toronto Radio Co., the Dominion Battery Co., and the Vimy Supply Co. Parts and sets were well displayed including "Reliable" batteries.

Jack V. Elliott Co.—The shining horn of the J. V. E. loud speaker was a feature of this exhibit which comprised a complete showing of receiving equipment.

A. H. Winter-Joyner—A substantial looking display of quality apparatus; Weston instruments and the Bristol Audiophone were featured.

Century Telephone Construction Co.—A fine showing was made of Federal Radio apparatus including parts and amplifier units. Mr. A. H. Dyson superintended the booth.

Chas. A. Branston Co.—The Armstrong Super Regenerative Circuit was embodied in a set that drew much attention to this display.

Salisbury Electric Co.—A display was made of Westinghouse R. C. sets which are being distributed by this company. Fall deliveries are promised.

Canadian Wireless Telephone Co.—A very small portable set, manufactured by the National Airphone corporation, drew much attention.

Marconi Co.—Receiving and transmitting sets of substantial character made up a very interesting display.

Burgess Battery Company.—Mr. G. S. Whitaker had a busy time answering enquiries concerning the full line of radio batteries shown.

Vawter-Luckett, Ltd., Toronto.—Featured Lefax Radio Service; fans seemed much interested in this handbook.

Diamond State Fibre Co.—This exhibit was located in a nicely decorated booth and comprised condenser bases, socket bases, rheostat bases, detector bases, washers, insulators, special shapes, dials, knobs, panels, tubing and other radio fibre products.

John Millen & Sons.—Pacent Radio Essentials, Atwater-Kent variocoupler and variometers, Canadian Independent Telephone apparatus and other equipment formed an interesting display.

Canadian Electrical Equipment Co.—Valley equipment formed the basis of this display, and the rectifiers and battery charges interested many.

Canadian Independent Telephone Co.—Well designed apparatus was shown here. A wavemetre formed an interesting feature, and the whole display gave an impression of substantial design and accurate workmanship.

Radio Equipment & Supplies.—Mr. Murray had a busy time explaining the functioning of a set which included two stages of radio and two stages of audio frequency. Loop aerial and peanut tubes were interesting features.

Northern Electric Company.—The Northern Electric Company had a large display room and a very fine showing of complete appartus and parts. A feature of the display was the demonstration of a complete receiving set on which exceptionally clear reception was obtained. The hook-up comprised two stages of radio frequency amplification and one stage of audio.

Licensed Broadcasting Stations in Canada

Station.	Call Signal.	Wave-length.	Range.	Power; anode input in watts.
Nova Scotia				
Halifax:—				
Marconi Wireless Tel. Co.	CFCE	440	150	500
Eastern T. & T. Co.	CJCS	410	150	1,500
New Brunswick				
St. John:—				
McLean Holt & Co.	CJCI	400	75	100
Jones Electric Radio Co.	CKCR	400	50	10
Quebec				
Montreal:—				
Marconi Wireless Tel. Co.	CFCF	440	150	500
Can. Westinghouse Co.	CFZC	400		
B. L. Silver.	CHCX	420	50	200
Northern Electric Co.	CHYC	410	250	2,000
Dupuis Freres.	CJBC	420	150	500
LaPresse Publishing Co.	CKAC	430	250	2,000
The Bell Tel. Co.	CKCS		250	2,000
Ontario				
Fort Frances:—				
International Radio Dev. Co.	CFPC	400	25	100
Hamilton:—				
Can. Westinghouse Co.	CHIC	400		
Wentworth Radio Supply Co.	CKOC	410	15	20
Iroquois Falls:—				
Abitibi P. and P. Co.	CFCH	400	75	250
Kitchener:—				
News Record.	CJCF	420	25	50
London:—				
London Advertiser.	CFCX	430		
London Free Press	CJGG	430	75	200
London Radio Shoppe.	CHCS	410	100	500
Radio Supply Co.	CKQC	410	50	25
Ottawa:—				
J. R. Booth, Jr.	CHXC	400	50	150
Toronto:—				
Star Publishing Co.	CFCA	400	250	2,000
The Bell Tel. Co.	CFTC		250	2,000
Marconi Wireless Tel. Co.	CHCB	440	150	500
Globe Printing Co.	CHCZ	420		
Metropolitan Motors.	CHVC	410	25	20
T. Eaton Co.	CJCD	410	10	15
The United Farmers.	CJCH	410		
Simons Agnew & Co.	CJCN	410	250	2,000
Evening Telegram.	CJSC	430	150	500
Canadian Ind. Tel. Co.	CKCE	450	250	2,000
Can. Westinghouse Co.	CKCZ	420		
Radio Equip. & Supply Co.	CKKC	410	50	200
Walkerville:—				
Motor Products Corp.	CFCI	440	250	2,000
Manitoba				
Winnipeg:—				
Can. Westinghouse Co.	CFCD	440		
Radio Corporation.	CHCF	430	200	2,000
Manitoba Free Press	CJCG	410	250	1,600
Tribune Newspaper Co.	CJNC	400	150	500
T. Eaton Co.	CKCB	450		
Salton Radio Engineering Co.	CKZC	420	100	100
Saskatchewan				
Regina:—				
Leader Publishing Co.	CKCK	420	200	2,000
Alberta				
Calgary:—				
Radio Corporation.	CFAC	430	200	2,000
W. W. Grant Radio.	CFCN	440	250	750
Albertan Pub. Co.	CHBC	410	200	500
Western Radio Co.	CHCQ	400	100	10
Edmund Taylor.	CJCY	420		
Edmonton:—				
Edmonton Journal.	CJCA	450	150	500
Can. Westinghouse Co.	CHCC	400		
British Columbia				
Nelson:—				
James Gordon Bennett.	CJCB	400	50	20
Vancouver:—				
Marconi Wireless Tel. Co.	CFCB	440	150	500
Victor W. Odlum.	CFYC	400	100	100
Radio Corporation Ltd.	CHCA	430	200	200
Vancouver Sun.	CJCE	420		400
Can. Westinghouse Co.	CHOC	400	150	150
Daily Province.	CKCD	410	150	500

Broadcasting Carried on During C. N. E.—Apparatus Used in Chain of Stations

The Canadian Independent Telephone Company played an important part in a special radio demonstration at the National Exhibition, as mentioned in the September issue of the Electrical News. All the apparatus used was designed, manufactured and installed by this company. The equipment sent out, for eight hours each day, a continuous flow of music and speech. without the slightest hitch occurring at any time.

In the unit comprising the broadcasting station four large power tubes were used, and two smaller tubes served as modulators. While the set was designed for a maximum input of approximately 2 kilowatts, it was seldom, if ever, operated at more than half capacity. The reason for this is that the ranges secured have exceeded the expctations of the designers and further, the life of the tubes is greatly enhanced by working somewhat below their maximum output.

The efficiency of the set has been found, in actual practice, to be from 60 to 70 per cent, (the exact value depending upon local conditions) that is to say, something like 65 per cent of the energy delivered to the anode circuit of the power tubes leaves the antenna.

The effectiveness and high quality of the modulation is attended by scores of reports from points over the Dominion and the United States.

The receiving set was also one manufactured by this company. It is known as the "Univercal" receiver and consists of a detector and two steps of amplification.

A chain of broadcasting stations that stretches across Canada is another achievement of the Canadian Independent Telephone Company. These stations are located in Toronto, Winnipeg, Regina, Calgary and Vancouver, and are similar in design to the one described above. It has been found that the western stations are able to carry on radio-telephone communication with one another, and that the practical working voice range of each station will be of the order of six to eight hundred miles at night and at least three hundred and fifty miles in the daytime. The Regina station has been heard a thousand miles to the south and on the Pacific coast, and the Toronto station has been heard in Nova Scotia and Georgia.

This company has been carrying on research and development for the past two years, and the present apparatus was only adopted after much painstaking work. It is claimed that a new system of modulation has been developed, which is a real advance in the art of radio communication. Formerly it was necessary to use as modulator units the same size and number of tubes as were used for power tubes; by the new system a comparatively small tube controls the output of the largest power tube.

Recent achievements by this and other radio companies bring Canada to the forefront in the wireless game. It may be expected that the art of radio communication in this country will advance as rapidly as in any other country in the world.

The Latest Developments in Electrical Equipment

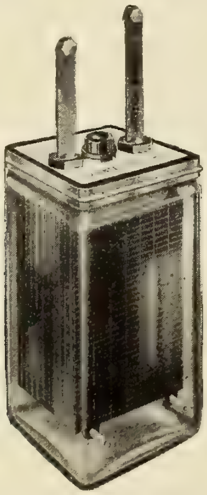
Electric Clock

That the utility of an electric clock can be combined with a pleasing design is proved by one of the newer designs of "Telechron" electric clocks made by the Warren Clock Company, Ashland, Mass., which is shown in the illustration.

The case is brass. The regulating mechanism of these clocks is at the central power station, where a master clock controlling the frequency of the current regulates all of the "Warren" clocks on the system.

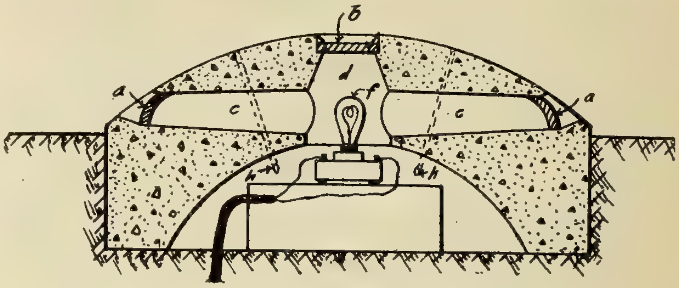
"New-Seal" Battery Cell

A battery, the jars of which are made of heavy cast glass with a reinforced top, has been placed on the market by the Universal Battery Company, 3446 South La Salle Street, Chicago, Ill. The metal cover fits on a seat inside of the jar with a thin layer of sealing compound between it and the sides of the jar. A large screwed vent opening is provided in the cover, elevated to prevent spilled electrolyte from running back into the cell. Cover and element are bound together by a hard rubber nut which fits on the threaded terminal posts. A tight seal is formed by a soft rubber gasket used below the cover. The manufacturer states that the plates are hand pasted and are uniform in weight and finish. Wood separators are used. A lug is cast on each end of the plate through which a hard rubber rod passes, serving as a separator support.

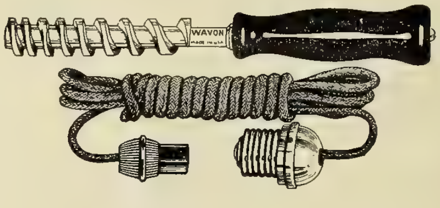


A New Traffic Light

This traffic light is constructed of indestructible material and embodies an illuminating device, built in such a way that it cannot be damaged or broken. It consists of a dome-shaped reinforced concrete body containing a chamber in which are arranged the necessary electric light connections. From the centre of the body there are a number of bores (c) extending radially, the outer ends of which are closed with colored lenses (a) placed diagonally therein. A relatively larger lens (b) is also placed within a vertical hole (d).



Metal linings assist to a great extent the reflection of the light rays. An ordinary electric light bulb (f) serves to supply the necessary lighting. Air vents (h) are also provided for the purpose of ventilating the interior of the dome. This traffic light device is patented in Canada.

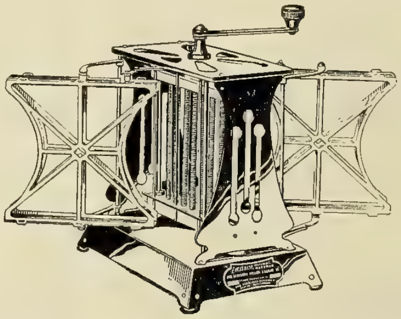


Wavon

The cut illustrates the use of the Wavon, an electrical device manufactured by Frank W. Morse, 289-291 Congress Street, Boston, U. S. A.

"Excelsior" Electric Toaster

The Perfection Electric Products Corporation, New Washington, Ohio, is making an electric toaster in which one turn of the knob at the top operates both racks for the toast. The appliance is equipped with a "70-50" Cutler-Hammer feed-through switch. The arrangement of the coils in the heating element insures an even distribution of heat. The device is being marketed by George Borgfeldt & Company, Sixteenth Street and Irving Place, New York City.



If we who are engaged exclusively in the electrical game are to hold and extend the appliance business, we must all face the situation squarely and adopt attractive measures to gain an increased volume of sales.

Current News and Notes

Belle River, Ont.

A 26,000 volt line is being built from the Essex Hydro high-tension station to Bell River, where an out-door sub-station will be erected to supply the municipality. The construction of rural lines will be carried on in the adjacent district.

Bloomfield, Ont.

Applications for 80 h.p., for industrial uses have been received by the Bloomfield Hydro-electric System.

Brampton, Ont.

Caledon ratepayers will vote on October 9 to decide whether the council will raise $32,000 to operate an extended telephone system and whether a franchise will be given the Cataract Light and Power Co. to supply light, heat and power.

Brantford, Ont.

Increased rates on Hydro street lighting will take effect on September account of street lighting and will mean an increase of approximately $6,500 per year to the city.

Calgary, Alta.

Calgary's reputation as a leading telephone city with one instrument in use for every 4.10 persons, will be maintained this year, according to Mr. E. Eachers, who is in charge of of the production of the new telephone directory. The circulation of telephone directories in Calgary is approximately 32,000, and this year shows an increase of about 2,000.

Camrose, Alta.

The Pearce Electric, contractors and dealers, Camrose, Alta., have been awarded contracts for wiring of eight houses in Camrose.

The Camrose Municipal Light, Power and Waterworks, Supt. Mr. J. S. Eby, are installing a new boiler at their plant, manufactured by Goldie and McCulloch Ltd., Galt, Ont., fired by stokers manufactured by the Underfeed Stoker Co. of Canada Ltd.; also installing a feed pump in connection with boiler, and making necessary alterations to boiler house for new boiler.

Cardinal, Ont.

The village of Cardinal has requested the Hydro-electric Power Commission to submit an estimate on the cost of supplying electric energy to the municipality.

Chatham Ont.

It is announced that the C. W. & L. E., whose lines run from Wallaceburg to Erie Beach, will undertake extensive repairs to their tracks during the present fall season in order to get the road in good shape for the winter traffic. It is stated that five thousand ties have already been purchased from the C. and J. Hadley Lumber Company, and these will be used up immediately in the ballasting, which will be done, both north and south of the city.

Edmonton, Alta.

The Hillas Electric Company, 10041 Jasper Avenue, Edmonton, Alta., have been awarded the contract for wiring, lighting fixtures, and switchboard for the new library of the Edmonton Library Board, at an estimated cost of $3,686; also the contract for the wiring of the new barns at the Feeble Minded Home at Oliver, Alta.

On October 1st., a by-law will be voted on regarding the expenditure of $325,000 for a power plant.

Estevan, Sask.

In a report to the local council, the town engineer has recommended the installation of an additional generator. Increased domestic use and the addition of several street lights has increased the load beyond the capacity of the present plant.

Hamilton, Ont.

In connection with the problem of having the overhead wires in the centre of the city removed the cost of putting the fire alarm wires underground would be about $16,000 Controller Davis stated recently. Chief TenEyck had plans for an elaborate fire alarm system which would cost $109,000, and would wholly replace the present one. According to statistics produced by the city engineer, there were at present 1,300 poles in the underground district. Of this number 630 could be removed. Those left would be mostly the small iron standards used to support the street railway trolley wires.

Judgment allowing the appeals of the seven bus companies carrying on business between Hamilton, Cayuga, Dundas, Guelph, Waterdown, Binbrook and Toronto, has been given by Judge Gauld. The appellants were engaged in transporting passengers between Hamilton and outside points and do no city business. It was contended on behalf of the city that it had expended large sums in the construction of roads and therefore it should be allowed to tax omnibuses operating from other municipalities for using the highways. The Judgment stated that the merchants of the city who contribute through their taxes to the construction of these roads are materially benefitted by the passengers brought to the city by these omnibuses and the imposition of such a license fee as the by-law calls for would cramp and harass trade.

Kemptville, Ont..

The Greenville Crushed Rock Company have discarded their steam plant and are using 400 electrical horse-power.

The Kemptville Milling Company, who supplied the municipality previous to the advent of Hydro Power, has brought two lawsuits against the municipality asking for arbitration between the company and the municipality, but in both cases the court has decided in favor of the municipality with costs against the company. As a final effort, however, the Kemptville Milling Company are now sueing the town of Kemptville for $46,000.00 damages done to their property by the town in erecting a new distribution system. The municipality takes the stand that this company has no franchise, or any rights whatever, on the streets of the village.

Kitchener, Ont.

Messrs. Ellis & Howard Ltd., of Kitchener, Ont., recently opened a branch store dealing in electrical fixtures and appliances, at King Street, Preston, Ont. The store, which is a very large one being 40 feet wide by 85 feet long, is located in a good section of the town, right in the centre of the main street. The store is managed by Miss E. L. Schartzber.

Lindsay, Ont.

Messrs. Pickering & Cote, of Lindsay, Ont., have recently purchased the interest of the Electric Wiring Co. Both are well-known to the trade, having done business in this town for many years. They report that business is good.

London, Ont.

A report on the London Street Railway dealing with its present value and means and costs of improving it should the citizens decide in favor of purchase, will be prepared by the Hydro-electric Power Commission experts, it is stated. The report will be available before December, when a vote of the people on the street railway policy is to be taken.

Just east of Ashland Avenue a cable belonging to the Bell Telephone Company, containing over 200 wires, was struck by lightning in a recent storm and together with the drenching the wires received, the whole cable was put out of commission. Throughout the city some three or four hundred services were rendered useless, but it was stated that they would be repaired in short order.

Manitou, Manitoba..

The citizens of Manitou have prepared a large petition asking for the extension of a transmission line to that town. This would involve an extension of the Portage la Prairie line.

Montreal, Que.

In response to an inquiry as to what use is being made of the proceeds of the five million dollar issue of stock made last spring by the Bell Telephone Company, President L. B. McFarlane said recently: "Just as quickly as it can be done, we are converting that five million dollars into revenue earning telephone plant. We have made such satisfactory progress so far as to very materially cut down the list of waiting applicants for service. At the peak of the demand last April there were some 31,178 unfilled orders for connection on our books. This has been reduced to 23,592, and the total gain exceeds 16,000 suscribers' telephones. Full gangs are now in the field and the construction of additional exchange buildings, switchboards, underground conduit, and pole lines for overhead wires and cable is progressing rapidly."

The Canadian Comstock Company Limited, Montreal, have been awarded the contract for the electrical work on the million dollar addition to the plant of the Durant Motors of Canada, Limited, at Leaside, Ont. They are also installing the complete electrical work on the new pulp and paper mill for St. Lawrence Paper Mills, Limited, at Three Rivers, Quebec. This contract includes installation of high and low tension electrical work in sub-station, and distribution feeders for power and lighting; it also includes high and low pressure and boiler house steam piping work. Other contracts include the electrical work on the Medical Arts Building, Montreal, for which the Foundation Company are the general contractors; and electrical work on four cargo boats for George H. Hall, Fraser-Brace and Company, general contractors.

Niagara Falls, Ont.

The Hydro-electric Power Commission has recently approved of an additional debenture issue of $100,000 for the Niagara Falls Hydro-electric System to take care of extensions and improvements to the local plant. The Niagara Falls System has shown a remarkable growth in connection with domestic service during the past year. Manager P.B. Yates of the Public Utilities Commission stated recently that the Niagara System load was the heaviest now of any time since the armistice was signed.

Ottawa, Ont.

The total amount of electrical power exported from Canada to the United States during the fiscal year ending March 31, 1922 was 861,567,183 kilowatt hours, being a decrease of 157,996,828 kilowatt hours as compared with the previous year.

Major F. D. Burpee, general manager of the Ottawa Street Railway, on behalf of the company, and F. W. McRae, president of division 279, signed an agreement recently between the company and the men, based on the finding brought in some three months ago by a board, of which, Alexander Smith, K. C. was chairman. The chief clause in the agreement signed to-day, and the one on which the company and men finally agreed on, reads as follows:—"The company agrees to meet with and treat, through their properly credited officials, with officials and representatives of division No. 279, upon questions and differences that may arise durng the term of this agreement, including dismissals, after suspension."

Portage La Prairie, Manitoba.

Owing to the delay in the shipping of steel towers, repairs to the Portage la Prairie transmission line have been delayed. Three carloads of towers will be required to place the line in operation once more. The village of Oakville, about 11 miles east of Portage on the south side of the Assiniboine river, will receive power as soon as the line is opened.

Port Arthur, Ont.

Advertisements have run in the local papers, prior to the adoption of one-man operation, by the Port Arthur Civic Railway. The ads. were a good example of utility advertising, giving the reasons for changing over, the new schedules, and stating that the employees and management alike were of one purpose in serving the public in the best interests of the city.

Manager Inglis of the Public Utilities Commission, recently announced that the use of one-man street cars on the local street railway had been approved by the Ontario Railway and Municipal Board.

Prescott, Ont.

Electrification is proceeding rapidly in the Prescott Rural Power District. The Hydro-electric Power Commission now has 66 contracts on this 12 miles of rural line and one consumer is erecting a large saw-mill in the village of Spencerville with the intention of installing a 40 h.p. motor to run a 50 inch saw, planer and other woodworking machinery.

Provost, Alta.

The Town of Provost, Alta, are contemplating installing an electric light plant, sewers and waterworks.

Quebec, Que.

Announcement was made recently that the Quebec Railway, Light, Heat and Power Co., has just negotiated a contract with Denaston Breakey, president if John Breakey Co., for the supply of a large amount of power for a period of twenty years for the operation of the plant at Breakeyville, P. Q. This contract is for a minimum of five hundred horse-power. The Breakey Co. will extend their own transmission line to the company's plant at Breakeyville on the Chaudiere river, and the power will be taken as soon as the work is completed. It is also stated that the company is completing arrangements to furnish about 400 horsepower in excess of present requirements of the Chateau Frontenac Hotel.

A delegation from the Lake St. John-Chicoutimi district waited upon the Provincial Government recently to oppose the building of the Kenogami dam, instead of the erection of a barrage at the Grand Discharge. The argument advanced by the delegation was that the construction of a dam at the Grand Discharge would be of greater general advantage to industry, while the Kenogami dam would only benefit a limited number of interests. The delegation admitted that the Grand Discharge project might entail a larger expenditure, but argued that the results would make it the cheapest in the long run as the power would be a source of supply to the entire Province, as not less than 1,000,000 horsepower would be available.

At a meeting of the directors of the St. Anne Power Co., held recently, the following officers were elected for the ensuring year: President, Geo, C. Bayless; Vice-President, A. W. Cooper; Treasurer, F. J. Bayless; Secretary, C. E. Taschereau.

St.. Thomas, Ont.

A telephone wire, falling across a 2,200-volt Hydro-electric power wire at Dutton on Sept. 20, resulted in the electrocution of Reginald Gillard, a lineman in the employ of the Bell Telephone Company.

St. Catharines, Ont.

Arrangements have recently been made for the construction of a rural distribution system in the Beamsville district to supply approximately 400 rural consumers. Power for the district will be transmitted at 12,000 volt from St. Catharines and stepped down at an outdoor sub-station. The 12,000 volt line will also be extended to Grimsby.

Stratford, Ont.

At a meeting of the Ontario Railway and Municipal Board it was decided to charge all subscribers of the North Easthope Telephone Company $5 extra for two years for the purpose of meeting the liability caused by the ice storm last winter.

Shawinigan Falls, Que.

L. G. Cummings, employed by the Shawinigan Power Company, was electrocuted recently, when he touched a wire carrying 6,600 volts.

Stouffville, Ont.

Mr. P. R. Stover, well-known to the electrical trade. and a returned man, has recently been selected for the position of superintendent of municipal electrical lighting at Stouffville, Ont., by the Municipal Council, to supersede Mr. H. Kenmear.

Tononto, Ont.

Among the resolutions passed at the first annual convention of the Canadian electrical trade union held recently was one requesting provincial legisiation to license electrical workers, similiar to that introduced by Charles Swayze, M.P.P. of Niagara Falls, during the last session, and another requesting that the inspection system of the provincial Hydro-electric Commission be placed under the Labor Department.

Toronto, Ont.

Messrs Cavers & Harvey recently of Brock Ave., Toronto, have opened a new store at 2021 Yonge Street, well stocked with everything in electrical fixtures and appliances. The store is known as the Hyglo Electric.

F. G. Taylor & Sons, electrical dealers, late of 1162 St. Clair Ave., Toronto, have removed to a new store at 1664 Dufferin.. .

E. L. Roxborough, Limited, have sent out notices announcing this new firm of electrical contracting engineers as successore to Ramsden and Roxborough. A formidable list of important electrical work is given as evidence of the wide experience of Mr. Roxborough.

Mr. J. V. Stark, manager of the Continental Electric Company, King Street East, Toronto, manufacturers of the Royal vacuum cleaners, is on a business trip to Vancouver. He is covering territory both ways west of Winnipeg.

Getting out from his truck to remove an electric wire which obstructed the road on Yonge street, near Davisville avenue, Danial McMarrow took hold of the wire, wound it round a post once, and then received an electric shock, from which he died shortly after.

It was recently decided by the Board of control to arrange a conference with the Provincial Hydro Commission on the question of taking over the Toronto Suburban lines and the price to be paid for them. The principal question to be discussed is whether the Hydro can still purchase these lines from the Dominion Government at the price mentioned some years ago.

In a speech at the Canadian National Exhibition, Sir Adam Beck pictured the approach of the time when Hydro-electric radials would bring 2,000,000 to the fair. His speech was mainly a plea for the radials, and he made the challenge that if the radial lines were given a free right-of-way through the country they would carry traffic at one-fifth the cost of motor bus transportation. He predicted that out of Buffalo alone his Niagara Radial would bring 100,000 people in two weeks. He promised the C.N.E. heads that the Exhibition would not suffer by reason of the right-of-way cutting through the Exhibition park.

The cost system under which the Toronto Railway Company was compelled to take over the railway property back in 1891 should be a guide as to the condition under which it must sell to the city, according to the argument which was advanced on Sept. 19 by Hon. N. W. Rowell, legal representative of the company, who opened the argument in the Street Railway arbitration case. Some thirty years ago, Hon. Mr. Rowell pointed out, the Railway Company was obliged to buy the old horse-car system, in face of the fact that it knew at the time it would be compelled within a very short time to re-equip the system and fit it out for an electrical service. In other words, the principle applied on that occassion was that the company had to buy the existing system at the cost of reconstruction, less depreciation; so Hon. Mr. Rowell declared that the same principle should be applied now. As he sees it, the city should be instructed to pay the Railway Company for the line on the basis of an operating concern, and the figure should be the cost of construction for the three-year period prior to 1921, less depreciation.

Uxbridge, Ont.

Hydro will shortly be installed in Uxbridge, Ont. Preparations are almost completed, and it is hoped the change from municipal lighting to hydro will take place in the next few weeks. It is interesting to note that this little town has been enjoying the benefits of electric lighting for the past 35 years. The municipality purchased the plant from private ownership about 4 years ago.

Walkerville, Ont.

Application of the Freeman-Bondy Bus Company to institute a bus service in Walkerville has been refused by the town council. Mayor Stodgell and councillors, in refusing the application, point out that they are in duty bond to support the Hydro-electric Railway wherever and whenever possible.

Occupancy of the $60,000 Hpdro-electric block will take place soon, according to officials of the company. The building is one of the most handsome structures erected on Wyandotte street in its history. With the installation of Walkerville's new "White Way" along this section of Wyandotte street, the location should prove to be one of the best in the Border Cities. Large display windows on Wyandotte street and Argyle road will contain every known electrical convenience used in the modern home.

Winnipeg, Man.

A resolution recently passed by the Winnipeg branch of the Canadian Manufacturers' Association reads as follows:—

"Whereas the city of Winnipeg proposes to erect a steam standby plant with an immediate capacity of 12,000 or 15,000 h.p., at an estimated total cost of $1,500,000 to supply power for the operation of its street lighting and waterworks system and to supply commercial plants in the event of an interruption to the Hydro-electric system; and whereas the erection of this standby plant will also involve the expenditure of a large sum of money annually for maintenance and whereas the Winnipeg Electric Railway company already maintains a steam standby plant in Winnipeg;

"Therefore, be it resolved that the Winnipeg branch of the Canadian Manufacturers' Association respectfully urge the city council to enter into negotiations with the company with a view to arriving at some satisfactory plan for the joint use, in cases of emergency of the Winnipeg Electric Railway Company's power by that company and the city hydro department, before proceeding with the expenditure of a large sum of money by the city for a separate steam standby plant."

Wiring Contracts Awarded

Ancaster, Ont.

Jno. Fish, 291 Crockett St., Hamilton, $17,000 res.

Brantford, Ont.

T. J. Minnes & Co., 9 King Street, Brantford, $105,376 school, Grand & George Sts.

Hamilton, Ont.

Culley & Breay, 35 King St. W., altn. to stores & offices

J. A. Dynes, Prospect St., $8,000 altn. apts., 11-13 Bond St.; $22,000 apts. (16) Barton St., East.

Kentville, N. S.

Perce DeFry, $6,000 res., Main Street.

Kingston, Ont.

James Harris, 4 Cooper St., dairy school.

Moncton, N. B.

Wm. G. Crowley, St. George St., $5,000 each two res., West St.

T. Johnson Co. Ltd., Main St., $6,000 res., Winter Ave.

J. W. Fraser, 132 Steadman St., car barn.

Montmorency Village, Que.

Nap. Boily, $8,000 fire hall, Co., Montmorency.

Montreal, Que.

Crown Electric Co., 169 Ontario W., $28,000 presbytery Delormier Ave.

A. Gauthier, $8,000 three flat res., Hutchison St.

Ernest Gregoire, 170 St. Timothee St., $25,000 two res., Botrel St.

O. Labelle 332 Seigneurs St., $8,000 res., Montclair Ave.

J. Mathieu, 1117 De Castelneau St., $14,000 six flats, Bellechasse.

R. S. Muir & Co., 32 Park Ave., $17,000, two cottages, 35 & 37 Grey Ave.

F. Neyrinck, 802 De Gaspe St., $9,000 res., Bercy St.

Rene Deliger, $50,000 apt. house, Berri & St. Catherine Street E.

Sayer Electric Co., 87 Bleury St., $50,000 warehouse, Notre Dame E.; $30,000 res., Montrose Ave.

R. Talbot, 2112a Boyer St., $15,000 four res., Chambord Street.

Convention of Contractors and Dealers in Toronto, November 13 and 14

New Liskeard, Ont.

Toronto Electric Co., 101 Duke St., Toronto, continuation school, wiring.

Outremont, Que.

Sayer Electric Co., 87 Bluery St., $125,000 apt. house, Bernard Ave.

Ottawa, Ont.

Stan. Lewis, 63 Metcalfe St., $110.000 office bldg., Gilmour & O'Connor Sts.

W. J. Tapp, Armstrong St., $7,000 res., Parkdale Ave.

Fred Wilson, 128 McLeod St., $60,000 add. to dairy bldg. Somerset St.

Renfrew, Ont.

Harris & Marson, 81a Parkway Ave., Toronto, $200,000 collegiate institute.

Sault Ste. Marie, Ont.

O. C. Carney, 516 Queen St. E., $4,000 res., Pim St.

Penfold & McBride, 275 Bruce Ave., $4,500 res., Simpson Ave.; $4,500 res., Gordon Ave.; $4,000 res., Dennis St.

Taylor Bros., Gore St., $8,000 store block, Wellington St.

Stratford, Ont.

Bennington Electric Co., Ontario St., $3,000 res., Devon Street.

W. J. Gaul, Charles St., $4,500 two res., Kent Lane.; $3,560 res., Albert St.

Toronto, Ont.

Salisbury Electric Co. Ltd., 112 King W., preparatory school bldg., Deer Park.

E. McNiece, Long Branch, $3,000 grocery store, Lake Shore.

Geo. Armstrong, 1217 College St., $9,000 res., Beresford Ave.; $15,000 res., 31 Woodycrest Ave.

Bayview Electric Co., $7,500 addn. to store, rear 378-80 Yonge St.

Bennett & Wright, 72 Queen E., $150,000 res. & garage, Bayview Ave., York Twp.

Major Electric Co., 7 Bloor E., $6.000 res., Chesterhill Road.

Westmount, Que.

Sayer Electric Co., Bleury St., Montreal, $20,000 pr. semi-det. res., Grosvenor Ave.

Winnipeg, Man.

Star Elec., Co., 185 Lombard St., Wpg., $220,500 office bldg., Kennedy and Graham.

Company Incorporations

Below is given a list of 9 incorporations that have recently taken place. One incorporation does not mean much, but a group of 9 has significance. Business is steadily improving, money is loosening and expansion is taking place. The number of concerns being incorporated for the purpose of making or otherwise dealing in radio equipment is an indication of the effort that will be put into this business in the future.

Come to the Convention, Nov. 13 and 14.

Wireless Corporation of Canada, Limited, $50,000, Montreal; manufacture, etc., of all kinds of wireless goods.

Kerr Line Telephone Company, Limited, $7,000, Foresters Falls, Ont; construction and equipment of telephone systems.

The Brudenell Telephone Company. Limited, Brudenell, Ont.; construction and equipment of telephone systems.

Whitman Radio Company, Limited, $20,000, Montreal; manufacture, etc., of radio equipment.

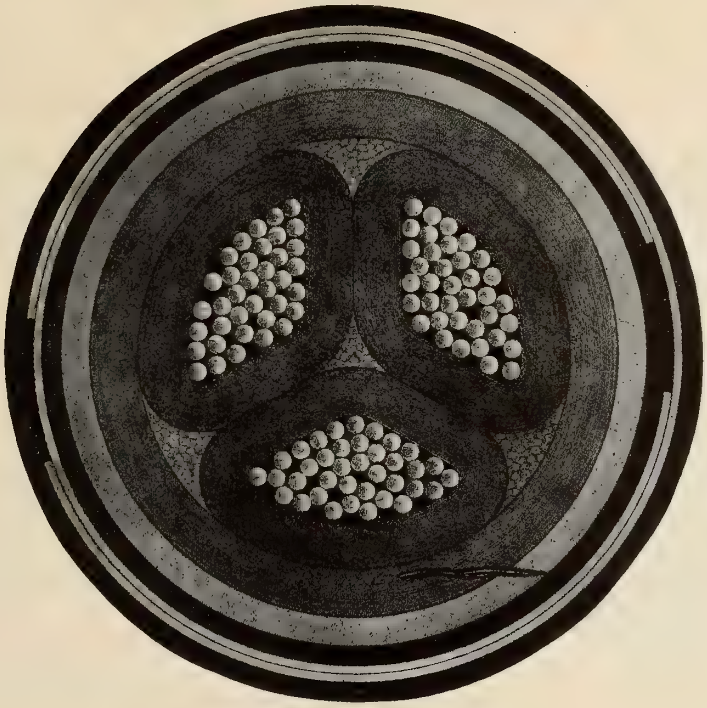
Electric Lighting Products, Limited, $40,000, Toronto; manufacture, etc., of electric fixtures and other electrical goods.

Western Electric Company, Limited; supplementary letters patent decreasing capital stock from $2,500,000 to $746,000.

Dominion Insulator & Manufacturing Company, Limited, $50,000, Niagara Falls, Ont.; manufacture, etc., of porcelain and other insulating materials.

Transportation and Power Corporation, Limited, $15,000,000, Montreal; to purchase assets of the Great Lakes and Atlantic canal and Power Company, Limited, and carry on business.

POWER CABLE



350,000 C. M. 3-Conductor 12000 volt
Paper Insulated, Steel Tape Armoured Cable

Overall Diameter—3.62 ins.
Built to Specification of Hydro-Electric Power Commission of Ontario

Eugene F. Phillips Electrical Works, Limited
Montreal

The Oldest and Largest Manufacturers of Bare and Insulated Wires and Cables in the British Overseas Dominions

Dominion Insulator & Manufacturing Co., Ltd.

(Division of The Ohio Brass Company)

ANNOUNCES

That it is now constructing a factory at Niagara Falls, Ontario, for the manufacture of the most up-to-date, approved designs of High Tension Porcelain Insulators and other O-B Products, such as Trolley Materials and Rail Bonds for Electric Railways and Mines, Electric Car Equipment and Steam Road Electrification Materials.

The new plant will be of the latest construction and will be equipped with every modern facility for the production of this class of material by the most advanced processes.

The factory will be in production sometime before January 1st, 1923.

The Ohio B Brass Co.

Mansfield, Ohio, U.S.A.

Products: High Tension Porcelain Insulators; Trolley Material; Rail Bonds; Electric Railway Car Equipment; Third Rail Insulators

Sell "Heat" This —Winter—

National
ELECTRIC

HEATRAY

In appearance and performance the **Heatray** is worthy of your highest recommendation. The element has an Edison Base and fits like a lamp. Terminal connections are of solid steel. Cord and plug are separate.

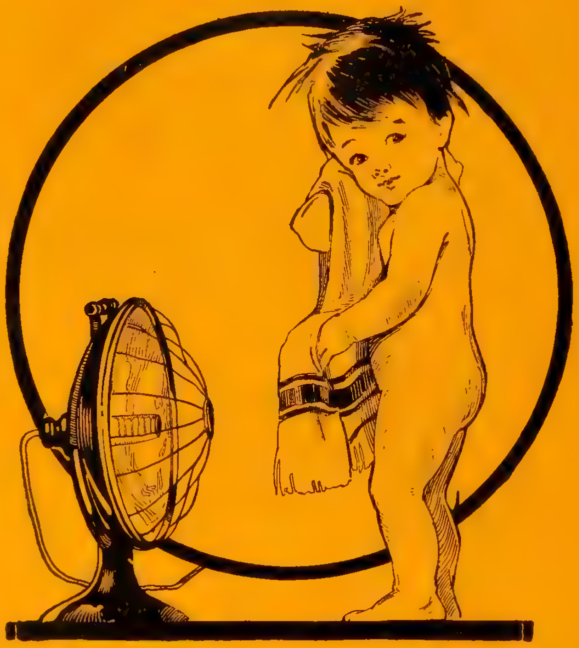
Heatray
Cat. No. 1215

It's an ill wind that blows nobody good. The coal strike which has jeopardized the fuel supply of the country presents a wonderful opportunity for the electrical man who offers comfort to his customers through National Electric Heating appliances. The **Heatray** Portable Heater will sell by the thousands this fall and winter, and much of this business should be yours. Order now.

THE NATIONAL ELECTRIC HEATING CO., LIMITED

TORONTO, ONTARIO

Sales Offices
Montreal Winnipeg Vancouver



How is Your Stock of Cozy Glow Heaters?

This year there is going to be a greater demand than ever for Westinghouse Cozy Glow Electric Heaters, especially during the Fall months when coal may be difficult to secure.

You can avoid the possibility of lost sales by looking over your stock now, and ordering sufficient for your requirements this winter.

Cozy Glow Heaters are of the same dependable Quality as all other Westinghouse Products. They are the culmination of many years experience in designing and building Electrical appliances.

You will find that a window display of Cozy Glow Heaters will result in large sales, and upon request we will be pleased to send you a very attractive display card in colors, showing the child, as illustrated in this advertisement.

CANADIAN WESTINGHOUSE COMPANY, LIMITED
HAMILTON ONTARIO

Westinghouse

COZY GLOW ELECTRIC HEATERS

Made in Canada

A Perfect Range
for the Modern Kitchen

Winter is coming on and the attention of most people is centred upon indoor affairs—the home and its conveniences.

There will be a large demand for Electric Ranges during the next few months, and enterprising dealers are not slow to realize this and prepare to meet it.

The Westinghouse Electric Range, like all other Westinghouse products, has real quality built into it. It is the culmination of fifteen years experience in the designing and building of Electric Ranges.

It is attractively finished and embodies many features that are of great advantage and which are only found in a WESTINGHOUSE.

A demonstration of the good points of the Westinghouse Range will result in easy sales.

CANADIAN WESTINGHOUSE COMPANY, LIMITED
HAMILTON ONTARIO

Westinghouse
ELECTRIC RANGES

Made in Canada

CANADIAN WESTINGHOUSE CANADIAN WESTINGHOUSE

Announcement

EXTRAORDINARY

An Electric Heater to Retail $7.50

Specification

Solid copper reflector 11″ diameter, beautifully burnished cast iron base weight 2½ lbs., dia. 7″, fluted design. Base and back of reflector finished in indestructible black enamel—adjustable reflector. Filament equal to any on the market. 600 watts, 110 volts A C or D C. Equipped with 7 feet standard underwriters approved cord and two piece separable attachment plug.

Gilbert Polar Cub Electric
Heater $7.50

We will soon be sold up—Act now

The A. C. Gilbert - Menzies Co., Limited

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TORONTO

Heating Appliances

- Portable Air Heaters—All Styles
- Heating Pads
- Toasters—Regular and Turnover
- Grills—Single and 3 Heat
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Full Stocks for
Immediate Delivery

UNIVERSAL—HOT POINT—
STAR—SUPERIOR

Great West Electric Co. Limited
Winnipeg

ELECTRIC FIXTURES

Floor Lamps

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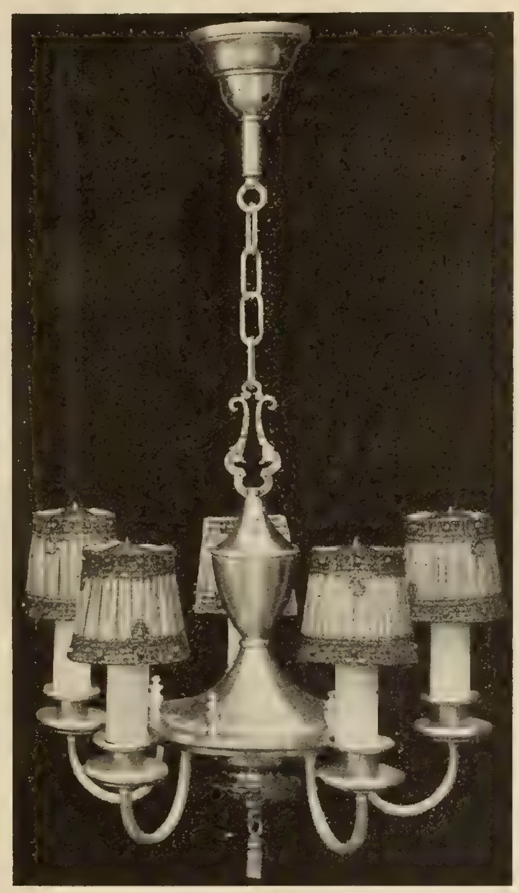


Electric Fixtures

Semi-Indirect Fixtures

Hall Lanterns

Commercial Lighting Fixtures

"Heatray" Electric Heaters

0676/440. Five-Light Butler Silver Candle Fixture, spun closed body, five bent reeded arms, spun candle cup and plate, and spun canopy in Butler silver finish, fancy cast chain loop, body ornament and tassel in silver and black, length 36 inches, spread 17½ inches. Wired complete, with French silk candle shades in Rose, Gold or Blue color. No bulbs.

Trade Price $20.25

"Equator" Electric Heaters

We will send our new 40-page catalogue to Electrical Dealers on request.

NERLICH & CO.

146-148 Front St. West, Toronto

Electric Steam Generators Found Successful in St. Maurice Valley

Four hundred tons of coal are saved daily in the St. Maurice Valley by the adoption of electric steam generators in two large industrial plants, the Laurentide Pulp and Paper Company and the Belgo-Canadian Pulp and Paper Company. This fact was brought out during the recent sessions of the American Electrochemical Society, in Montreal, when a paper on "Electric Steam Generators and Their Application" was read by P. S. Gregory, of the Shawinigan Water and Power Company.

100 Installations in Europe

The discussion which followed brought out the fact that there are some 100 installations already in Europe. Professor Wilder D. Bancroft, of Cornell University, declared that some day the electric firing of porcelain will bring artistic and decorative porcelain to a very much higher state of perfection than ever before thought possible.

Although the method of generating steam by electricity is most advantageous for certain purposes and for certain industries, it is by no means generally applicable, and the day has not come when general utilization of electricity for generating or heating purposes is possible.

The electric steam generator consists essentially of a closed pressure vessel, to which is connected a source of water supply, and from which water may be drawn off at the bottom and steam at the top. In this vessel electric energy is made to flow through the water from an electrode in the form of a plate, or tube, to the shell of the vessel or to the metallic inner lining. Alternating current energy is used at a pressure varying from 110 up to 12,000 volts.

The generators are constructed for the use of 3-phase power, either by employing three electrodes in one vessel or by the use of three vessels, with one electrode in each, in which case the outer shells are connected together in star. In this type of generator there is no heating surface, the generation of steam taking place throughout the water, and as a consequence no portion of the apparatus is at a higher temperature than the temperature of the steam. This is a most important feature from the viewpoint of safety and continuity of operation.

To Meet Canadian Conditions

This type of generator has recently been further developed and made applicable to conditions on this continent by Mr. F. T. Kaelin, of the Shawinigan Water and Power Company.

Several other papers, all of a highly technical nature, were read during the afternoon session. Discussing the value of electrochemistry to mankind, Mr. Carl G. Schluederberg, vice-president of the Westinghouse Company, Pittsburgh, and president of the society, stated that among the products of electrochemistry are ferro-alloys for the various high-grade steels entering into machines and machine tools, artificial abrasives for manufacturing processes, aluminium for aeroplanes and automobile motors, high-grade electric steel for similar purposes, tremendous quantities of chlorine used throughout the industries, phosphorus and nitrates for explosives; calcium carbide or acetylene, for welding and cutting; magnesium for lightweight alloys and intensive illuminative purposes; immense quantities of alkali used in almost every industrial process, etc.

"By concentration on the task," stated Mr. Schluederberg, "the much-vaunted chemical leadership of Germany has been shown to be possible of equalization. The old pessimistic cry of 'it can't de done' has been answered through the optimistic perseverance of the chemist, the electrochemist and the engineer."

"For example," he went on, "the supply of potash, formerly obtained from Germany, has been replaced through the work of our chemists and engineers by the potash of our lakes, rocks, seaweed and that precipitated electrically from the waste gases of cement mills and blast furnaces. Artificial dyes, 90 per cent of which were formerly imported from Germany, have been replaced by over 200 basic colors on this continent. The same can be said for many of our drugs and chemicals of commerce.

Smallest Radio Outfit in World

T. F. Renda, a young electrical engineer of Sutherland, England, has constructed a wireless receiving set in a pill box. Claimed to be the smallest such installation in the world, it is said that it is complete in every detail, and with it clear Morse code messages can be picked up from vessels passing along the northeast coast.

Amateurs Need Fear no Patent Tangles

So many dealers are asked by their customers about their rights to construct their own sets without coming into contact with the numerous awe-inspiring patents they read and hear about, that a word on the subject might not come amiss.

There is no reason, either in law or ethics why a person should not make any type of set or part and utilize any hook-up he pleases as long as the set is destined for his own use and is not offered for sale.

When it comes to making apparatus for sale there are few patented parts which are within the power of the amateur to make, owing to his limited manufacturing resource. However, the safest course in respect to these parts is to purchase them for inclusion in the set to be sold, as in the case of design patents on coil, etc., or to sell the set without, as in the case of tubes.

Miami-Barbados Cable is Opened

The Miami-Barbados cable of the Western Union Telegraph Company was opened for business on Aug. 26th after its use as a direct line of communication between North and South America had been blocked for more than eight months by a controversy between the company and the United States Government.

New Jersey Engineers License Now Required

Acting under the engineers license law passed at a recent session of the Legislature, the New Jersey State Board of Professional Engineers and Land Surveyors, with offices in Jersey City is now receiving applications from those desirous of practising professional engineering and land surveying in New Jersey. A fee of $25.00 must accompany an application to engage in either of these professions and for those wishing a license for both a fee of $35.00 is charged.

Contracts for First Half of 1922 Exceed Billion

A total of 3,867 important engineering contracts were let in the United States from Jan. 1 to July 1, 1922, valued at $779,766,747 as compared with $581,249,777 for the first half of 1921—a gain of 34 per cent.

The Middle Atlantic section leads with 1,024 contracts valued at $285,457,844 representing 37 per cent. of the total value of all large contracts let and includes 52 per cent. of the total value of all bridges, 25 per cent. of streets and roads, 27 per cent. of industrial buildings, 49 per cent. of Federal Government contracts and 67 per cent. of miscellaneous awards. Other sections of the country stand as follows: New England, 7 per cent. of the six month's total value; South, 11 per cent.; Middle West, 24 per cent.; West of Mississippi, 10 per cent. and Far West, 7 per cent. The 3,867 contracts are distributed numerically as follows: New England, 7 per cent.; Middle Atlantic, 26 per cent.; South, 10 per cent.; Middle West, 25 per cent.; West of Mississippi, 19 per cent., and 11 per cent for the Far Western states.

At a recent hearing before a board of army engineers in San Francisco a proposal was made to cross the bay at Carquinez Straits with a 3,000-ft. suspension bridge with a 1,500-ft. central spn. It is understood that the bridge, if constructed, would be used by a local transit company.

NEW AND USED

MOTORS

In Stock for Immediate Delivery

100 h.p.,	3 ph.,	25 cyl.,	550 volts,	710 r.p.m.
60 h.p.,	3 ph.,	25 cyl.,	550 volts,	750 r.p.m.
52 h.p.,	3 ph.,	25 cyl.,	550 volts,	720 r.p.m
50 h.p.,	3 ph.,	60 cyl.,	550 volts,	970 r.p.m
50 h.p.,	3 ph.,	25 cyl.,	550 volts,	720 r.p.m.
35 h.p.,	2 ph.,	60 cyl.,	200 volts,	1150 r.p.m.
30 h.p.,	3 ph.,	25 cyl.,	550 volts,	750 r.p.m.
30 h.p.,	3 ph.,	25 cyl.,	550 volts,	1500 r.p.m.
25 h.p.,	3 ph.,	25 cyl.,	550 volts,	750 r.p.m.
15 h.p.,	3 ph.,	25 cyl.,	220 volts,	720 r.p.m.
15 h.p.,	3 ph.,	25 cyl.,	550 volts,	750 r.p.m.
15 h.p.,	3 ph.,	60 cyl.,	220 volts,	1200 r.p.m.
13 h.p.,	3 ph.,	25 cyl.,	550 volts,	700 r.p.m.
10 h.p.,	3 ph.,	66 cyl.,	220 volts,	1333 r.p.m.
7½ h.p.,	2 ph.,	60 cyl.,	200 volts,	1120 r.p.m.
5 h.p.,	3 ph.,	60 cyl.,	550 volts,	1750 r.p.m.
5 h.p.,	3 ph.,	25 cyl.,	550 volts,	1500 r.p.m.
3 h.p.,	3 ph.,	60 cyl.,	550 volts,	1750 r.pm.
3 h.p.,	3 ph.,	60 cyl.,	550 volts	1120 r.p.m.
3 h.p.,	3 ph.,	25 cyl.,	550 volts,	1500 r.p.m.
3 h.p.,	3 ph.,	25 cyl.,	550 volts,	1400 r.p.m.
2 h.p.,	3 ph.,	60 cyl.,	550 volts,	1750 r.p.m.
2 h.p.,	3 ph.,	25 cyl.,	550 volts,	1440 r.p.m.
2 h.p.,	3 ph.,	25 cyl.,	550 volts,	1400 r.p.m.
1 h.p.,	3 ph.,	25 cyl.,	550 volts,	1500 r.p.m.
1 h.p.,	3 ph.,	25 cyl.,	110 volts,	1420 r.p.m.
1 h.p.,	3 ph.,	25 cyl.,	220 volts,	710 r.p.m.
½ h.p.,	1 ph.,	60 cyl.,	110 volts,	1725 r.p.m.
1/6 h.p.,	1 ph.,	60 cyl.,	110 volts,	1725 r.p.m.
1/6 h.p.,	1 ph.,	60 cyl.,	110 volts,	1150 r.p.m.

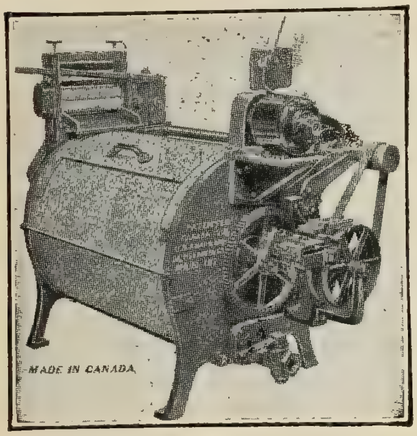
Machinery **Supplies**

Ask for our latest **stock list**

H. W. PETRIE, Limited

131-147 Front St. West, Toronto

Electric Washing Machines
FOR
HOTELS HOSPITALS INSTITUTIONS
AND
LAUNDRIES OF EVERY DESCRIPTION



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Strong
Durable
Efficient
Economical

With Patented Single Belt Reverse Movement

Made in all standard sizes with wood or iron casing. Run by motor and connected with lighting circuit or from line shafting, or gasoline engine.

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Manufacturers of Laundry Machinery

THERE ARE MORE EXPENSIVE BRUSHES—BUT NONE MORE EFFICIENT

No-Spark carbon brushes are frictionless. They will not chip or split and they give a no-spark commutation.

Economy is their middle name—we have instances of them outlasting 12 sets of ordinary brushes.

Write for Bulletin

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Canadian Representative
Cassco General Supplies, Reg'd., 315 Craig St., W.
Montreal, Canada

Electrical Books---Reduced Prices

The following Books are Offered Subject to Previous Sale:

A Laboratory Manual of Alternating Currents, by John H. Morecroft, E.C. Published in 1912 by Renouf Publishing Company. 248 pages, illustrated. Price $1.00.

Baudot Printing Telegraph System, by H. W. Pendry. Published in 1913 by Whittaker & Company. 144 pages, illustrated. Price $1.50.

Direct-Acting Steam Pumps, by Frank F. Nickel.. Published in 1915 by McGraw-Hill Book Company. 258 pages, illustrated. Price $2.00

Direct Current Machinery, Theory and Operation of, by Cyril M. Jansky, B.S., B.A., 1st edition, published in 1917 by McGraw-Hill Co., Inc. 285 pages, illustrated. Price $2.00.

Electric Railway, by A. Morris Buck, M.E. Published in 1915 by McGraw-Hill Book Company, Inc. 390 pages, illustrated. Price $2.50.

"Engineering Electricity," by Ralph G. Hudson, S.B., 190 pages illustrated. Published in 1920 by the John Wiley & Sons, Incorporated. Price $2.00.

Handbook of Machine Shop Electricity, by C. E. Clewell. Published in 1916 by McGraw-Hill Book Company. 461 pages, illustrated. Price $2.50.

"How to Sell Electrical Labor-Saving Appliances," by Electrical Merchandising, first edition, 115 pages, illustrated. Published in 1918 by McGraw-Hill Book Company, Inc. Price $1.00

Practical Electric Illumination, by Terrell Croft. First edition, published in 1917 by the McGraw-Hill Book Co. 225 pages, illustrated. Price $1.50.

"Practical Electrical Engineering,"—Direct Currents. A manual for use in industrial and evening schools and for home study, by Harry G. Cisin. Just published by D. Van Nostrand Company. 324 pages, 68 illustrations. Price $2.00.

"Practical Electricity For Beginners," by George A. Willoughby recently published by Manual Arts Press. 104 pages, illustrated. Price $1.00.

Principles of Alternating Current Machinery, by Ralph R. Lawrence. Published in 1916 by McGraw-Hill Book Company. 614 pages, illustrated. Price $3.50.

Principles of Electrical Design—D.C. and A.C. Generators, by Alfred Still. Published in 1916 by McGraw-Hill Book Co. 365 pages, illustrated. Price $2.00.

"Radio Phone Receiving." A practical book for everybody. Written by nine specialists. Recently published by D. Van Nostrand Company, 179 pages. Price $1.50.

Radiodynamics—The Wireless Control of Torpedoes and Other Mechanisms, by B. F. Miessner. Published in 1916 by D. Van Nostrand Company. 206 pages, 112 illustrations. Price. $1.50.

"Standard Wiring For Electric Light And Power", by H. C. Cushing, Jr. Twenty-Sixth edition, published in 1920. Reduced price, $2.25.

Telegraph Practice, a Study of Comparative Method, by John Lee, M.A. Published in 1917 by Longmans-Greene & Co. 102 pages. Price 75c.

Telegraphy—A Detailed Exposition of the Telegraph System of the British Post Office, by T. E. Herbert, A.M. Inst. E.E. Third edition. Published in 1916 by Whittaker & Company. 985 pages, 630 illustrations. Price $1.50.

"Theory and Calculation of Transient Electric Phenomena and Oscillations," by Charles Proteus Steinmetz. Third edition, revised and enlarged. Published in 1920 by McGraw-Hill Book Co., Incorporated. 696 pages, illustrated. Price $6.00.

"Testing of Electrical Machinery," for non-electrical students, by J. H. Morecroft. Fourth edition, revised and enlarged. Published by D. Van Nostrand Company, 1921. 220 pages, 111 illustrations. Price $3.00.

The Dynamo (2 volume), by Hawkins & Wallis. Published in 1909 by Whittaker & Company. Price $3.00.

The School of Practical Electricity (Electrician's Course in 2 volumes. Volume 1. Published by Electroforce Publishing Company, Milwaukee, Wis. 410 pages, illustrated. Price- $3.00

The Practical Railway Spiral, by L. C. Jordan, C.E. Published in 1913 by Van Nostrand Company. 155 pages. Price 50c.

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-Just Good Equipment-

GENERATORS— D.C. 125-250 volts

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15-30-50-75-100-300 Kw pulleys, bases and rheostats.

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3-5-7½-10-20-30 H.P. and upwards all complete.

All sizes of repulsion type single phase motors.

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All sizes of single phase motors, repulsion type only.

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YES—We can supply you with that receiving set you want. OR get that loose-coupler, tuning coil, condenser, insulator, grounder, battery, detector, wire, variometer FROM US.

ASK US QUESTIONS ABOUT YOUR SET OR WHAT YOU WILL INSTALL.

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220 Volt - 3 Phase - 25 Cycle

1— 5 HP. Robbins & Myers, 1500 rpm. Complete.

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25 Cycle Single Phase Motors 110/220 Volt

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All types and sizes of Motors, Generators and Transformers. Our work has been proven by the largest railway, mining, pulp and paper industries in the Province and also by 21 Public Utility Commissions.

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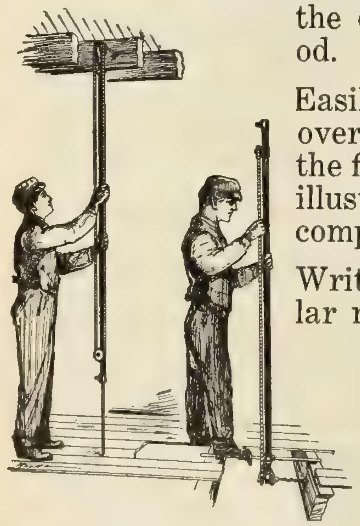
The Bowlus Chain Drive BORING MACHINE will bore more holes in an hour than you can bore in a day with the ordinary method.



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1—15 H.P. 750 RPM. T.H.E., Complete
1—10 H.P. 1500 RPM. T.H.E.
1— 1 H.P. 1500 RPM. Westinghouse
1— 1 H.P. 750 RPM. T.H.E.
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CRYSTAL DETECTORS

Mounted Complete

CRYSTAL DETECTOR SETS

Unassembled and unmounted.—Sample Mailed Free to Electrical and Radio trade on request.

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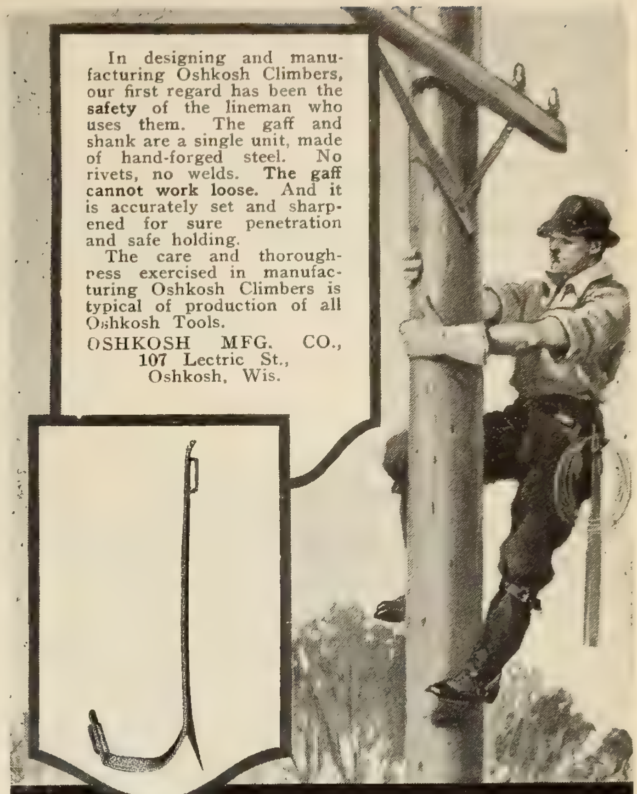

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The care and thoroughness exercised in manufacturing Oshkosh Climbers is typical of production of all Oshkosh Tools.

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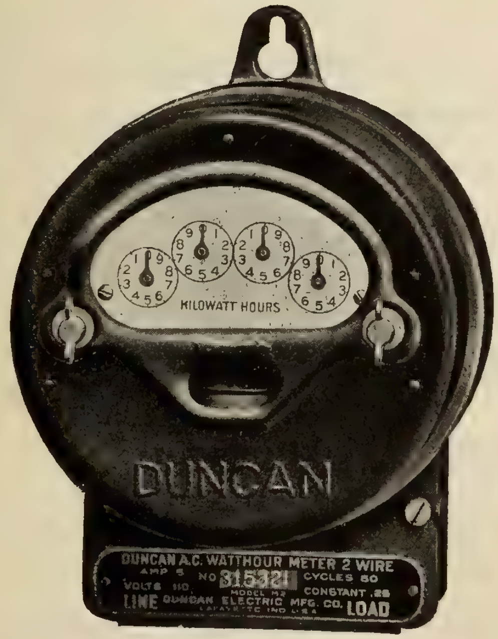
OSHKOSH CONSTRUCTION TOOLS



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TIME SAVER

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"ESCO" Motor-Generators for Generation of High Voltages

NORTHERN ELEC. CO.—Complete Peanut Tube Receiving Sets

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"UNITED" AUDIO FREQUENCY TRANSFORMERS

Two finishes; Black Enamel or Buffed Nickel Plated, $4.50

The beauty of the outside of this transformer is but a reflection of the superb workmanship under the shell—no howling—no distortion—clear amplification for one or more stages.

NOTE: Any advertised claim of having an arrangement with us to sell our products at special prices, is fraudulent.

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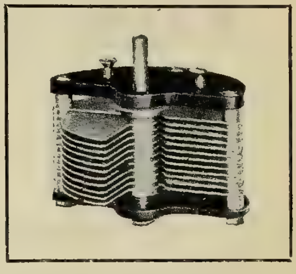

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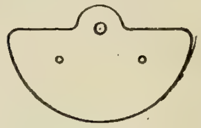
43 plate, $4.50; 23 plate, $4.00; 11 plate, $3.50; 5 plate, $2.75; 3 plate, $2.25, without dial or knob.

That "United" Condensers have become the standard with manufacturers of radio sets, by which all others are judged, is, in itself, the strongest endorsement of their superior construction and effectiveness.

Ask your dealer to show you this condenser. Then, you, too, will appreciate why it has been accepted as the standard.



Mounting made easy by our template for locating panel holes; packed free with each condenser.

UNITED MFG. & DISTRIBUTING CO.

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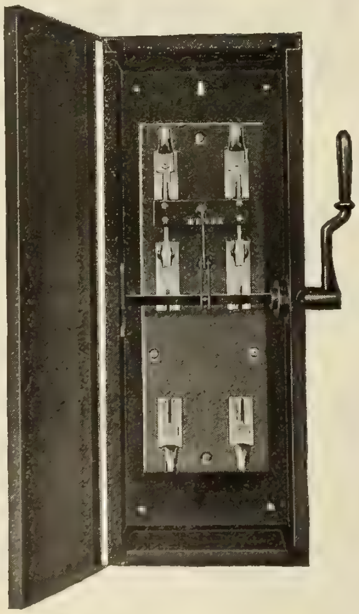
A Contractor is Judged by the Materials he uses



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WE GUARANTEE

Devoe Safety Service Switches

Write for Bulletin No. 19

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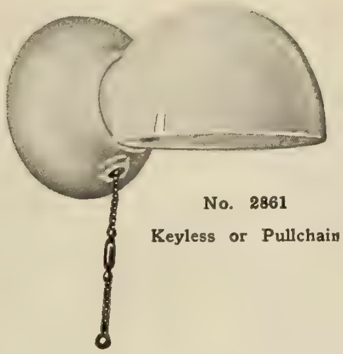

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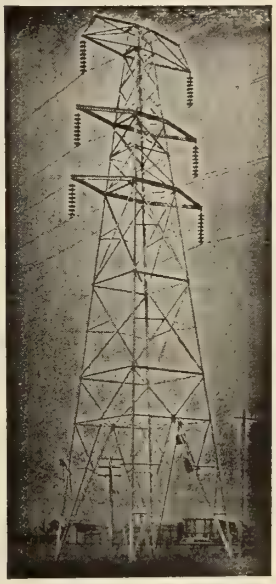

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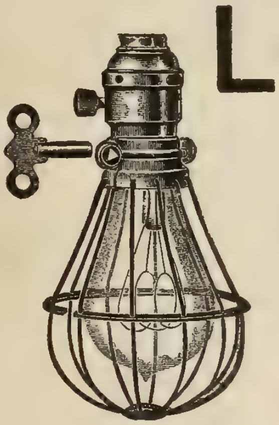

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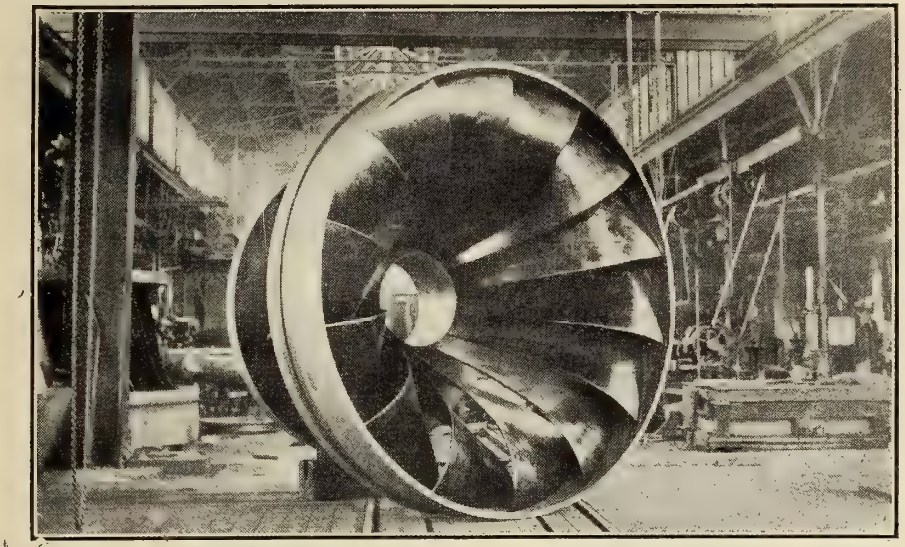

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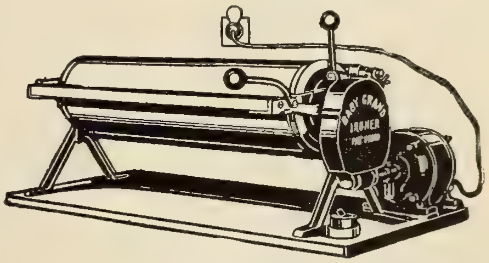

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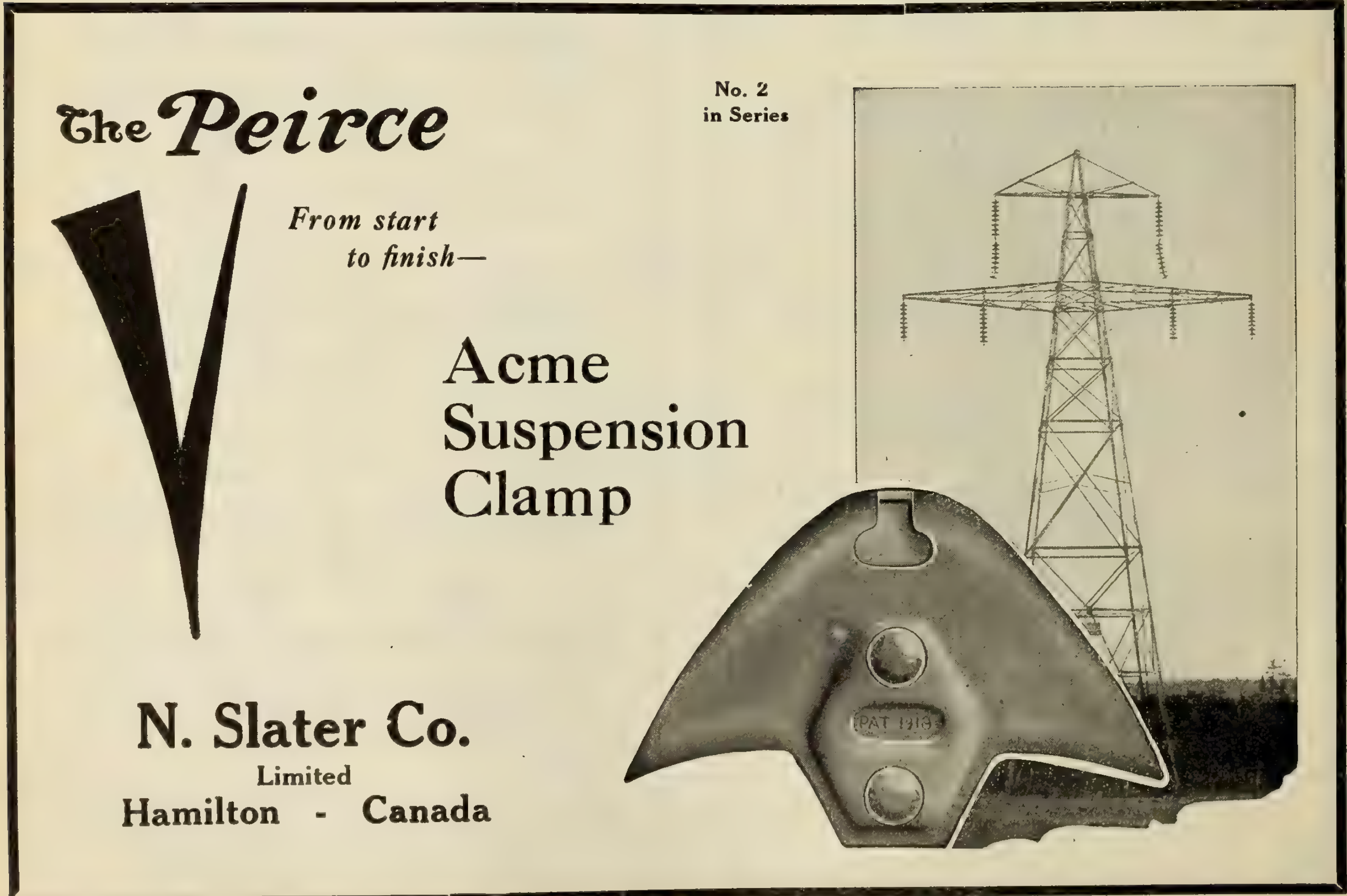
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Give your electrical equipment the attention it deserves.
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"Turn to the right and back comes your light"

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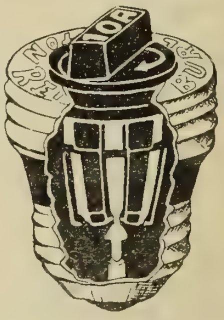

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"Repeater-6" marks the greatest forward step in the history of fuse making. It can be used six times and then refilled at a cost of a few cents. When one fuse blows, simply turn the switch to the right and back comes the power or light.

"Repeater-6" is made in 7 amperages ranging from 6 to 30 and the voltage is 110 to 125.

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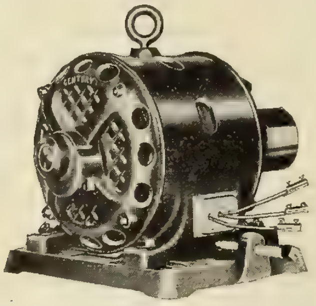
Squirrel Cage Induction
POLYPHASE MOTORS



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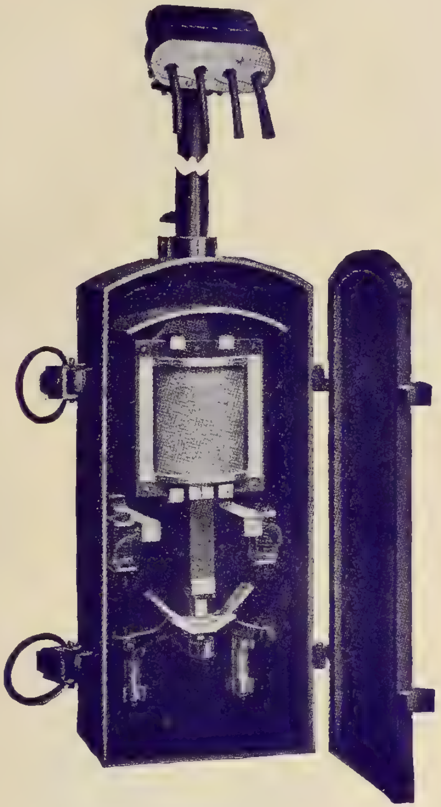

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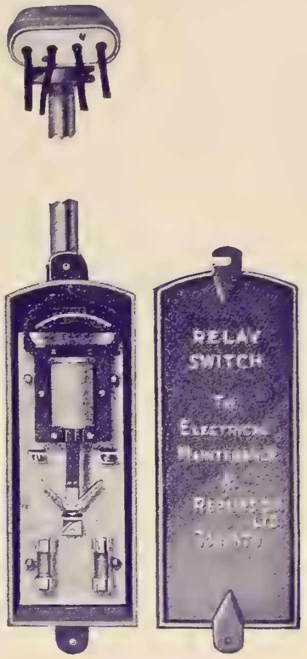

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It Cleans and Sweeps without injury to the rugs

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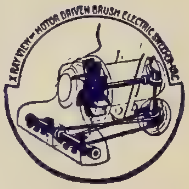

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Takes the "Weeping" out of "Sweeping"

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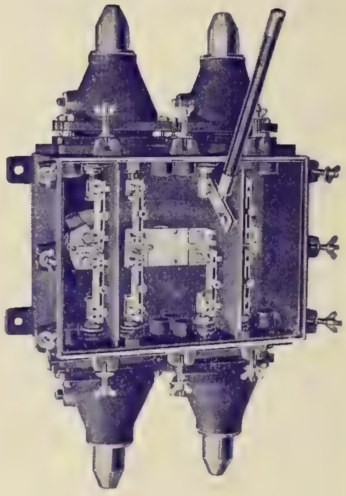
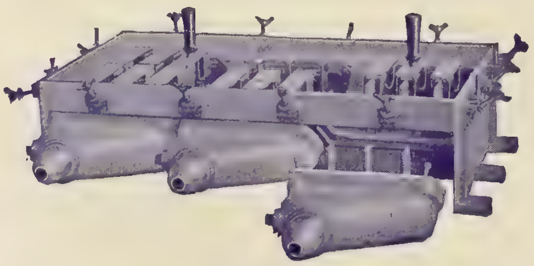
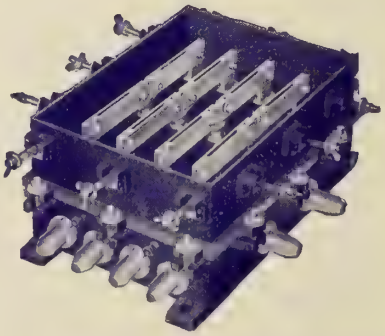


Your cable ends are vital not only in the sense that they must be carefully protected but also in the sense that they are a logical point for sectionalization and control of your distribution. Proper provision for emergency switching and cut overs at your cable ends will give the flexibility which is essential to proper distribution.

G & W Potheads and Boxes give absolute protection to the cable and at the same time can be the basis of a flexible distribution system.





G & W ELECTRIC SPECIALTIES

G & W Electric Specialty Company
CHICAGO 7440-52 So. Chicago Ave, U.S.A.

Vol. XXXI No. 20 Toronto, October 15, 1922

Electrical News

Engineering
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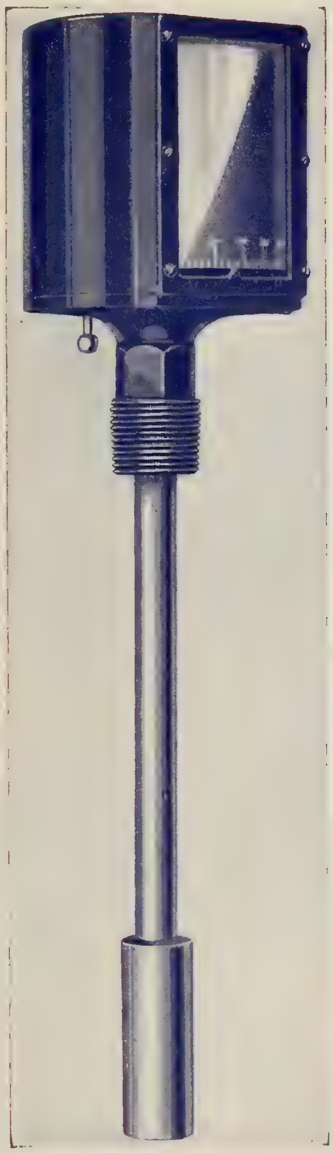
For Safety's Sake



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A Maximum Demand Heat Meter

Station Transformers, Circuit Breakers and in fact all machinery that is liable to reach a dangerous temperature by overload or any other condition should be equipped with this new meter.

Simple, durable and easily installed. Can be seen and read from the street or from the floor when used on large apparatus.
Saves all burnouts. Shows percentage of load on transformers at all times thereby indicating when lines may be re-adjusted so as to load transformers to better advantage.

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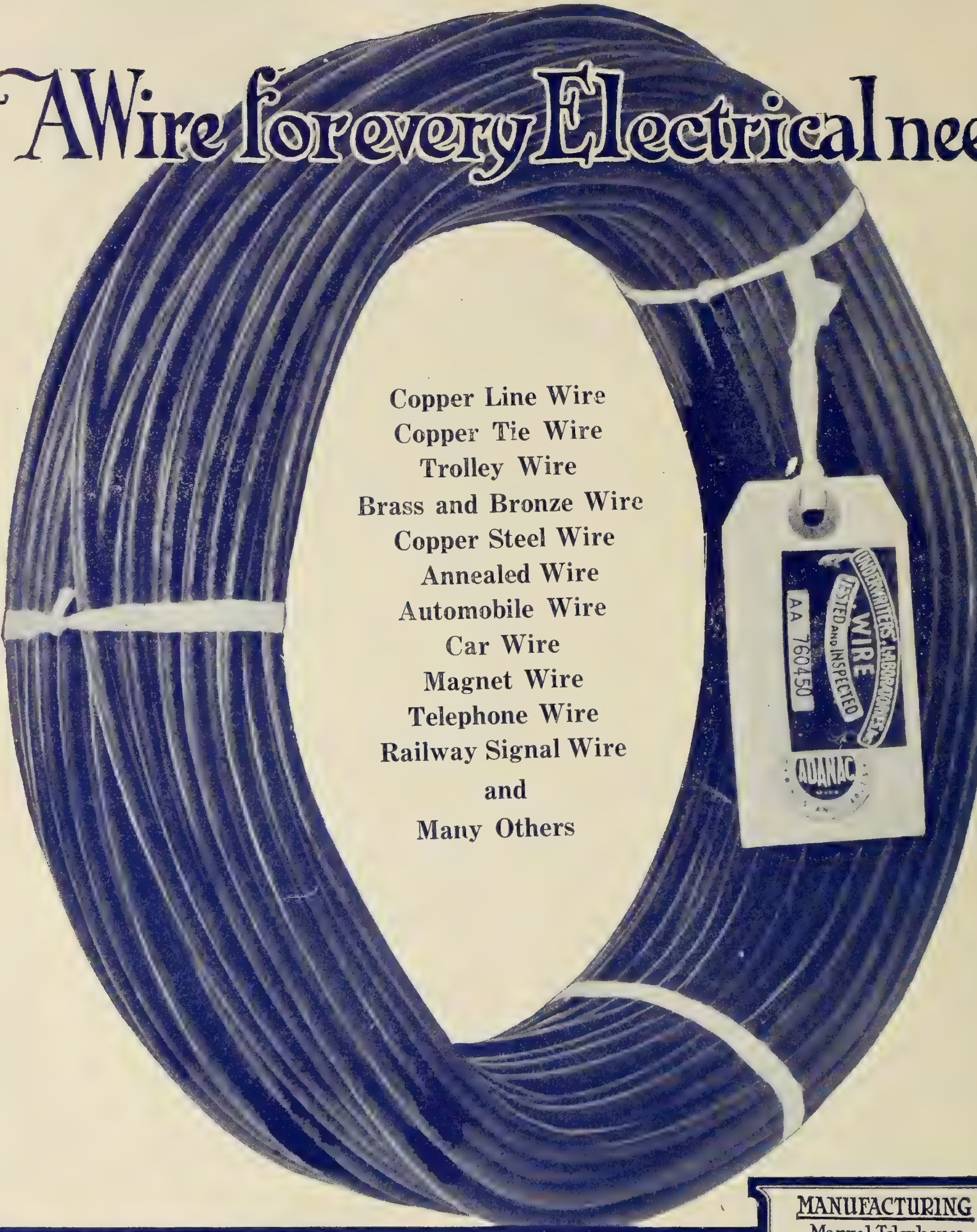
A Wire for every Electrical need



Copper Line Wire
Copper Tie Wire
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Brass and Bronze Wire
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Annealed Wire
Automobile Wire
Car Wire
Magnet Wire
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Railway Signal Wire
and
Many Others

Northern Electric Company
LIMITED

MONTREAL TORONTO WINDSOR CALGARY
HALIFAX HAMILTON WINNIPEG EDMONTON
QUEBEC LONDON REGINA VANCOUVER

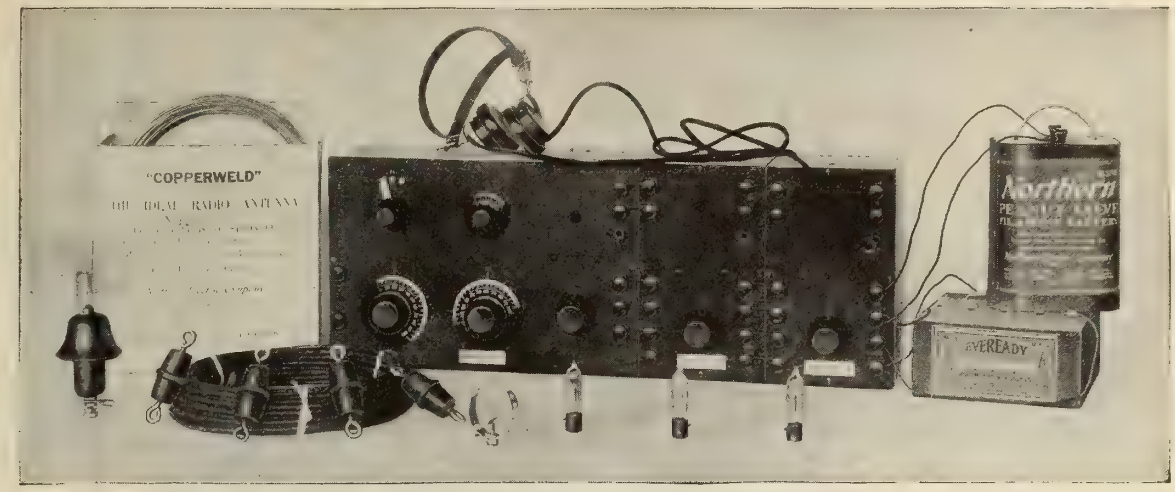
"Makers of the Nation's Telephones"

MANUFACTURING
- Manual Telephones
- Automatic Telephones
- Wires & Cables
- Fire Alarm Systems
- Radio Sending and receiving Equipment

DISTRIBUTING
- Construction Material
- Illuminating Material
- Power Apparatus
- Household Appliances
- Electrical Supplies
- Power & Light Plants
- Marine Fittings

ORDER THIS NEW SET EARLY

R 1000 Radio Telephone Receiving Set

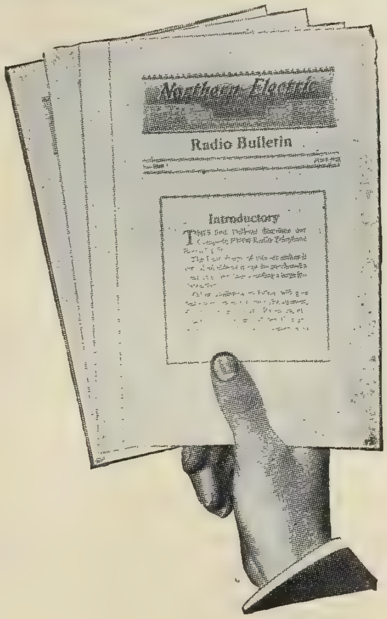


All Amateurs are your prospects with this set. You can sell it complete or a unit at a time in cases where the purchaser does not care to make a large initial outlay.

The wave length is from 200 to 600 meters, enabling the user to receive either local or distant Canadian or American Broadcasting, Shipping, Stock and Weather Reports, Official Time, etc.

Full instructions for installation and operation are packed with each set, thus simplifying your selling effort.

Detailed description and retail prices are in Bulletin No. 1000. Phone or wire our nearest House for your quota.



The R1000 Radio Telephone Receiving Set Consists of:—

1 No. R1 Short Wave Tuner and Detector Unit.

2 No. R5 Amplifier Units.

1 No. R6 Double Head Set, 2500 ohms.

1 No. R650 Aerial System.

3 No. R215—A "Peanut" Valves.

1 No. R180 Northern Peanut Valve Filament Battery.

1 No. R90 45 Volt Plate Battery.

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"Makers of the Nation's Telephones"

MANUFACTURING
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Wires & Cables
Fire Alarm Systems
Radio Sending and receiving Equipment

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EXIDE BATTERIES OF CANADA LIMITED

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For Every Purpose

Scores of great industries rely on the willing power of Exide Batteries.

Exides propel mine locomotives and trucks; they light railway trains, operate switches, provide current for the telephone system and in many other ways play an active part in the daily life of the Dominion.

All types of Exide Batteries for all purposes are sold by Exide Batteries of Canada, Limited. You are invited to take up with us any battery problem that may arise in your business.

Exide Batteries of Canada, Limited

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FOR BETTER INSULATION

SUPERIOR
WATERPROOF
INSULATION

SILENT
WATERPROOF
GEARS

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CONDENSITE

=CELORON=

Condensite Celoron (Hard Waterproof Fibre) because of its many peculiar properties fills a long-felt want in the electrical industry. It has great dielectric strength, is shock absorbing and for most practical purposes is chemically inert, insoluble and infusible. It actually improves with use.

Condensite Celoron comes in ready-made parts or in tubes, sheets and rods for your own machining. Write for full particulars.

Condensite Celoron is made in many grades to meet various requirements. Its adaptability and the ease with which it is cut, stamped or machined make it superior to all other materials. Grade 10 finds one of its greatest uses in the making of "Radio" equipment.

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A Single Wall Conduit of Unusual Flexibility.

Every coil of "Loomduct" and "Insuladuct" is fished at the factory and guaranteed against defects of every kind.

INSULADUCT

A Double Wall Conduit of Great Strength and Durability.

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REGISTERED

APPROVED BY THE
BOARD OF FIRE
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They were sent into the test room on Monday, the following Friday 302 Meters left the test room re-sealed, no parts or repairs being required to accomplish this end.

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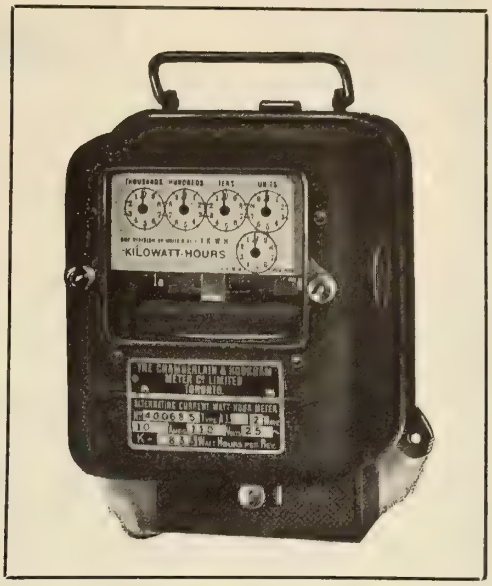

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Branches all over the World

Thomson Electric Motors

in use in many of the largest manufacturing plants in Canada

are built by

FRED THOMSON CO., LIMITED

ELECTRICAL ENGINEERS

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Order
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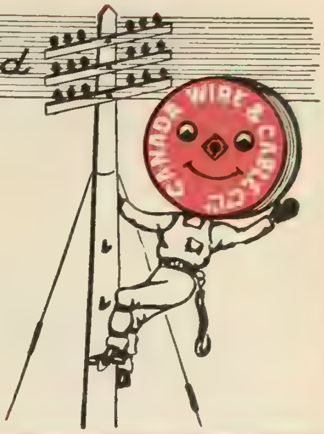

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Manufacturers of High and Low Tension Porcelain Insulators

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Manufacturers of Electrical Porcelain Specialties. Also specialize in the manufacture of heater bricks for electric ranges.

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Rubber Covered Wires and Cables

FOR POWER, LIGHT AND TELEPHONE WORK

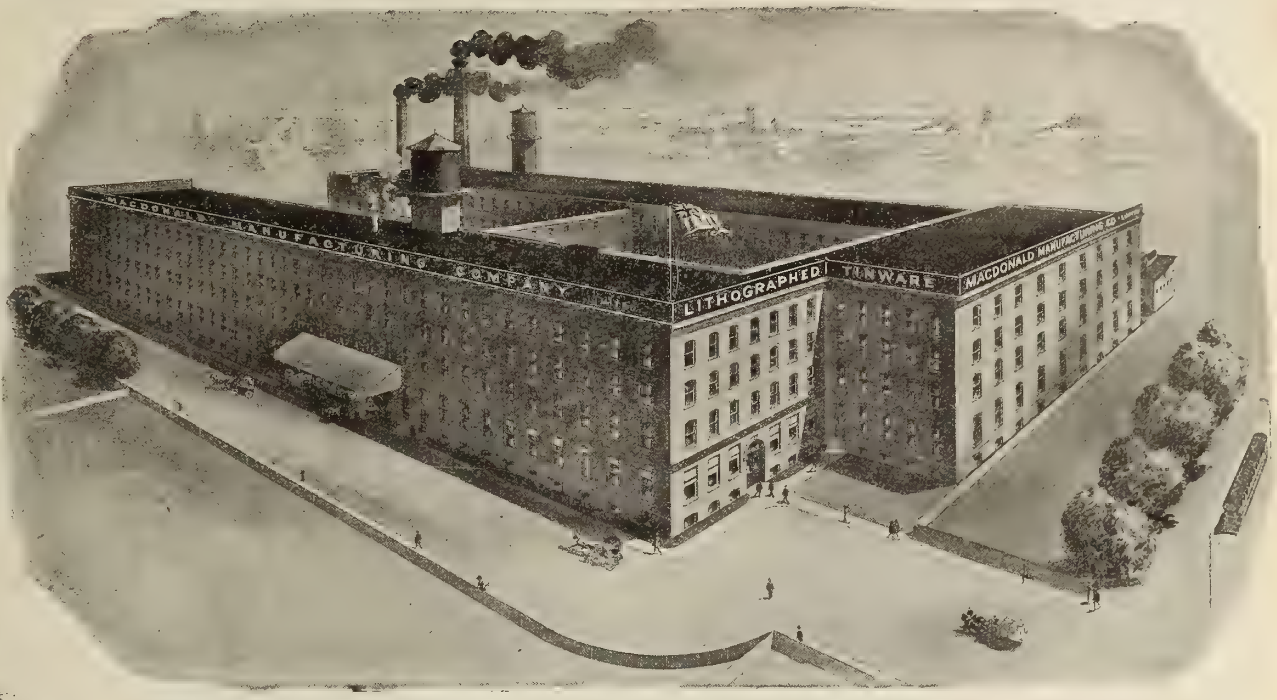
Incandescent Lamp Cord, Flexible Switchboard Cables, Special Cords and Cables for all kinds of Electrical Work.

Prompt Shipments from Canadian Factory.

BOSTON INSULATED WIRE & CABLE CO., Limited

Canadian Office and Factory, HAMILTON, ONT.

GALVADUCT



Plant of the MacDonald Manufacturing Company, Limited, Spadina Avenue, Toronto

"GALVADUCT"

The most perfect interior construction conduit on the market. Recognized as the standard of high quality.

Always specify Galvaduct or Loricated CONDUITS.

"LORICATED"

A high class interior construction conduit of the enamelled type, proof against acid or other corrosive agents.

If your jobber cannot supply you —write us.

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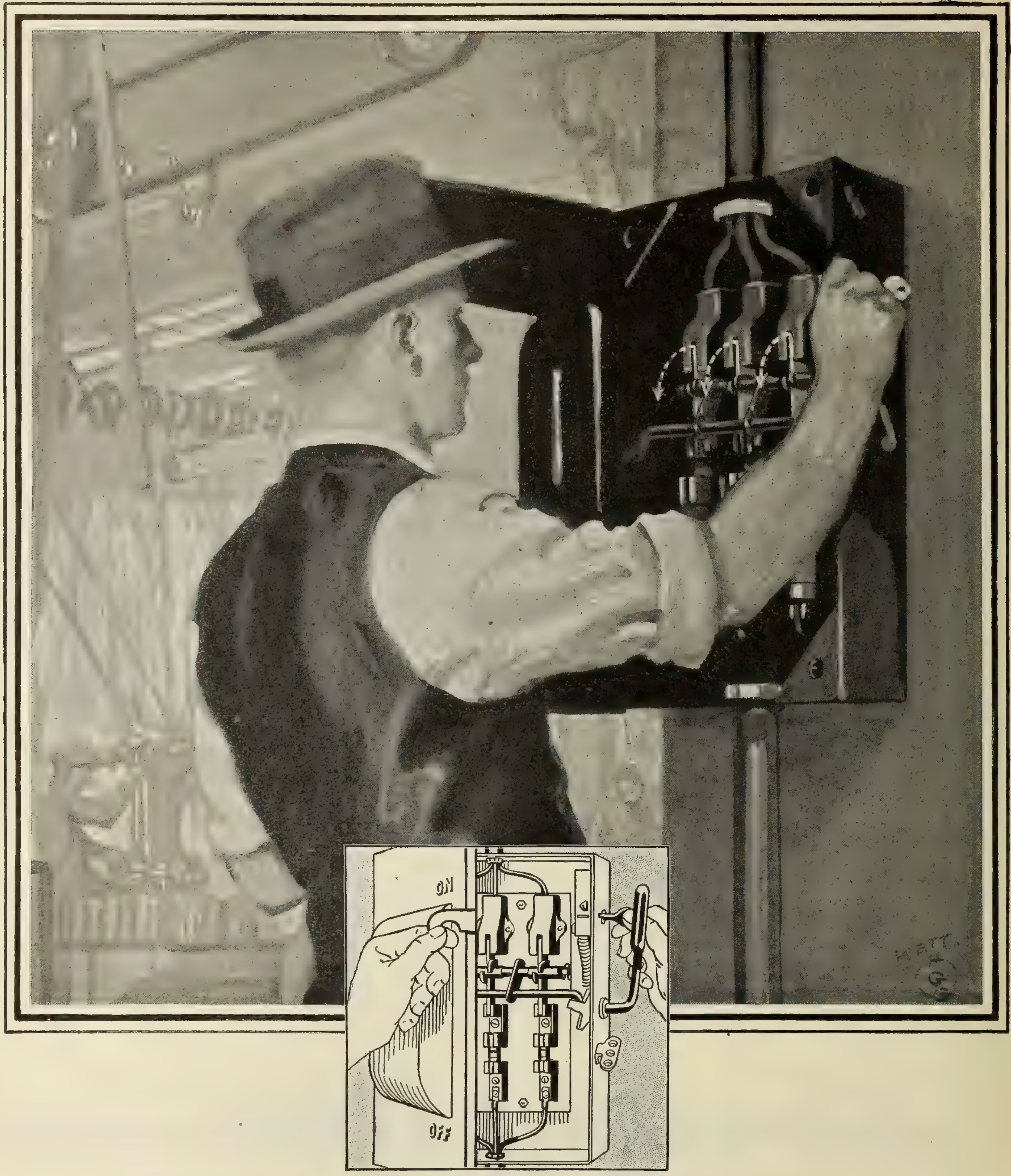


Only authorized persons having key can open the box when the switch is on

SQUARE D

Powerful Quick Make and Quick Break Mechanism

Gives Positive Assurance of Switch Being Fully On or Fully Off

One of the numerous features contributing to the exceptional popularity of the new 80000 Series is its quick make and quick break mechanism. This is enclosed within the box and protected against the clogging action of dust and grease. It snaps the blades solidly home and disengages them with equal sharpness. The blades are secured to an insulated steel crossbar which cannot split, char, or warp out of alignment. These features, together with the Square D Multi-Spring Jaws, insure positive contact under all conditions. Arcing is impossible and the switch is always all on or all off.

Proper Inspection Made Possible

As in the common "interlocking" switches, the cover cannot be opened when the switch is on or the switch closed when the cover is open except by the use of the Square D key. This key permits the switch to be inspected without breaking the circuit and to be operated when the cover is open, or the cover to be locked permanently shut. No other switch incorporates all these long desired features.

Parts Replaced in 3 Minutes

It has still another advantage that appeals to electricians—all parts are mounted on individual bases of moulded insulating material. Maintenance costs are kept down because any blade or jaw can be replaced in 3 minutes from the front of the box; and the drawbacks of the slate base—excessive weight, cracking, and shorts by metallic veins—are, of course, unknown.

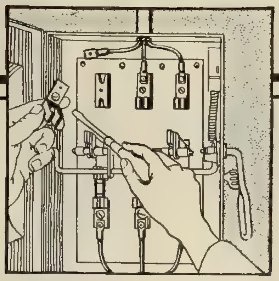
At the top and bottom of the box, ample space has been allowed to permit wiring without difficulty; and Easy Wiring end plates for any kind of conduit or open wiring are available for all switch sizes. This also means time saved.

Write Our Nearest Office Today

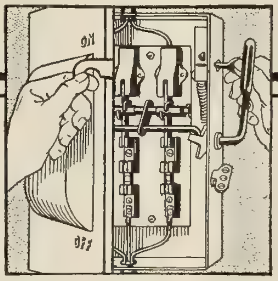
Contractor-dealers, electricians, production men, and purchasing agents pronounce the 80000 Series the final word in safety switches. Surely you will want to see its numerous superiorities. Upon request our nearest office will send a representative to show you why it is the one switch to sell or install!

SQUARE D COMPANY, Walkerville, Ontario, Canada
Sales Offices at Toronto and Montreal

(23)



Individual bases permit removal of any blade or jaw in 3 minutes



Only authorized persons having key can open the box when the switch is on

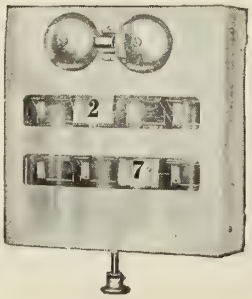
SAFETY SWITCH

Edwards Annunciators

We carry in Montreal, a stock of the fast moving sizes of Edwards No. 81, No. 91 and No. 125 Gravity Drop type Annunciators. They are typically "Edwards" in quality and our customers are assured of immediate shipments from stock.

No. 81 Dixie Type

Hand reset. Plain oak case for use in low cost installations such as flats, residences, etc. Battery or transformer operation.



No. 91 San-Fer-Ann

Hand reset. Neat appearing metal case, white enamel finish. Battery or Transformer operation.

No. 125 Wood and No. 125 M Metal type

Hand reset. Have fine substantial cases that may be finished to suit surroundings. Battery or transformer operation suitable for high grade installations.

Agents for Western Canada only:
Cochrane-Stephenson & Company Limited
Winnipeg, Man.

Couch Telephone Systems

The S. H. Couch Company have been making Intercommunicating Telephones for 27 years. Their equipment has reached a stage of mechanical and electrical perfection not surpassed by any other make.

Whether for Schools, Colleges, Industrial Plants and Business Offices, Private Dwellings and Apartment Houses, there is a system to met the individual requirements of service.

Bulletins and prices will be gladly sent on request

G. L. MacGillivray & Company Limited

3 St. Nicholas St. Montreal

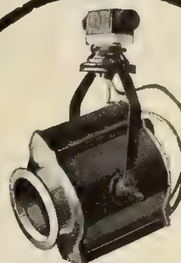
Ontario Representative:
A. R. Wooldridge
220 King Street West, Toronto

For Every Window Lighting Effect

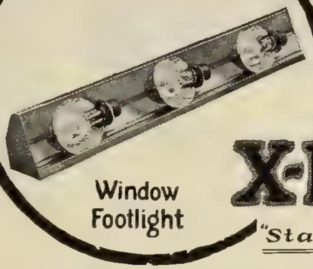
X-Ray Equipment gives you any result you wish

Write for Literature on X-Ray Window Lighting

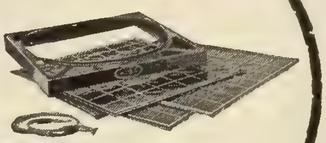
Jove #600



Spot Light #10307



Window Footlight



Color Ray

Use

X-Ray Reflectors

EVERLASTING BRILLIANCY

"Standard for Show Window Lighting"

NATIONAL X-RAY REFLECTOR COMPANY

TORONTO
GEORGE J. BEATTIE
72 Victoria Street

ENGINEERS IN ALL PRINCIPAL CITIES

WINNIPEG
COCHRANE-STEPHENSON CO., LTD.
602 Avenue Block

The Peirce

No. 3 in Series

From start to finish—

Universal Guy Wire Protector

Write for detail

N. SLATER CO., Limited

Hamilton - - - Canada

Banfield - Levolier
Pull Sockets

The best 660 watt pull socket ever offered to the trade. Priced moderately, made right. Improved snap shell fastening. Made in a number of different styles as to caps and shells. Your jobber has them in stock.

Western Representatives:

Cochrane, Stephenson & Co., Limited
Vancouver Winnipeg

W. H. Banfield & Sons, Limited
370 - 386 Pape Avenue - - - - - Toronto

DUNCAN
Model M 2
IS A
TIME SAVER
THEREFORE
A
MONEY SAVER

Bulletin 110

THE GEORGE C. ROUGH SALES CORP'N. 134 CORISTINE BLD'G. MONTREAL

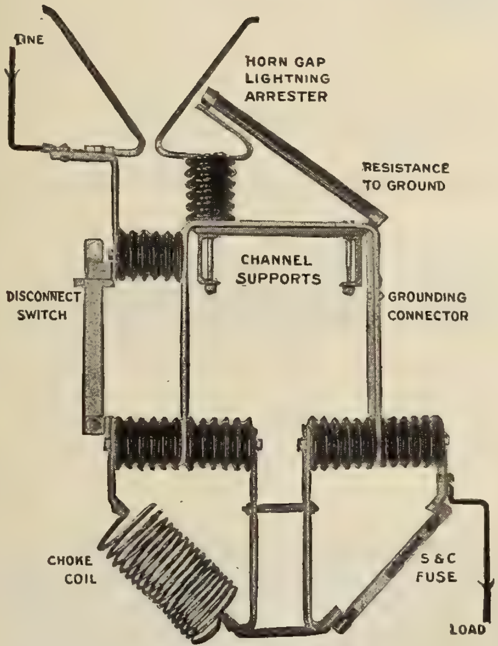
We are manufacturers, in a large way, of

TOP PINS, SIDE BRACKETS, POLE STEPS AND CROSS ARMS

We have been supplying this pole line material for years, from coast to coast, to the largest telephone, telegraph and electric lighting systems.

Our goods are specified where efficiency and economy are measured by actual results and not by purchase price only.

THE LACHUTE SHUTTLE CO., LIMITED
Lachute Mills, P. Q.



ONE SINGLE POLE "XW" UNIT
Horn Gap Arrester with Series Resistance to Ground, Disconnecting Switch, Choke Coil and "S & C FUSE" Mounting.

Simplified Substations with Complete Protection

for small and moderate loads for Rural Service, Small Towns, Industrial plants, etc.

The Economy and Simplicity of these Compact Assembled Units is at once apparent.

They are made in single pole, two pole and three pole combinations mounted on galvanized structural steel supports ready for your poles, with or without rod for operating switches from the ground.

7500-15000-25000-37000 Volt Service

Send for Bulletin 106-A

DISTRICT OFFICES:

Toronto, 24 Adelaide St. East.
Montreal, 134 Coristine Bldg.
Winnipeg, 703 Confederation Life Bldg.
Vancouver, 609 Credit Foncier Bldg.

SCHWEITZER S & C CONRAD, INC.
4435 RAVENSWOOD AVENUE
CHICAGO, ILLINOIS U.S.A.

"SOL-LUX"

The New High Efficiency Glass

Trade Mark

Sol-lux
MADE IN CANADA

Registered Canada

For Better Commercial Lighting

MANUFACTURED BY

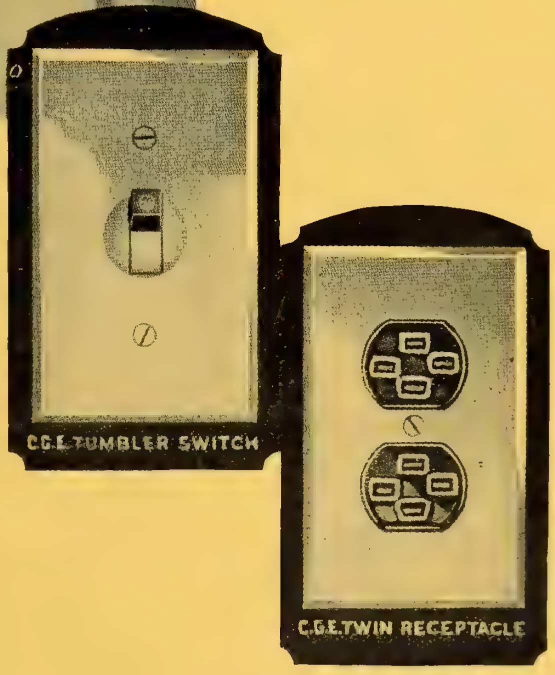
FACTORY & HEAD OFFICE
388 CARLAW AVE
TORONTO

DOWN-TOWN SHOW ROOMS
164 BAY ST., TORONTO

Jefferson
MADE IN CANADA
Glass
COMPANY LIMITED

285 BEAVER HALL HILL
MONTREAL
272 MAIN STREET
WINNIPEG
510 HASTINGS ST. W.
VANCOUVER

Electricity furnishes the modern builder with boundless opportunities for increasing the convenience of his houses —making them more saleable



Many houses are sold on their conveniences, alone

The public are demanding electric homes. Builders can no longer skimp the electric wiring and "get away with it." But it still remains for the Electrical Dealer to demonstrate to builders the necessity of using wiring devices of unquestionable workmanship.

Show your local builders the advisability of standardizing on C.G.E. Tumbler Switches, that work with a flip of the finger. Explain to them the dollars and cents value of installing plenty of C.G.E. Receptacles, placed in baseboards and walls, at just the places where women need them most for doing their housework.

C.G.E. Wiring Devices are manufactured for every possible household requirement. Packed in orange and blue containers, this line is the most economical and from a sales standpoint the most satisfactory to handle.

"Made in Canada" by

Canadian General Electric Co., Limited

HEAD OFFICE TORONTO

Branch Offices: Halifax, Sydney, St. John, Montreal, Quebec, Cobalt, Ottawa, Hamilton, London, Windsor, South Porcupine, Winnipeg, Calgary, Edmonton, Vancouver, Nelson and Victoria.

Hotpoint

Cat. No. N17
9 Cups

The P17 Hotpoint Percolator is constructed throughout of copper, and finished in bright nickel. The inside is silver plated. Equipped with Hotpoint percolating apparatus and safety switch. Creamer, sugar bowl and tray can be supplied if desired to match the Grecian Urn.

The P3 Hotpoint Percolator is the popular family model. Its pleasing appearance has a strong appeal to the housewife who prides herself upon her well appointed table. Finished in bright nickel, silver plated inside, ebonized wood handle, fibre tipped feet to protect polished surfaces. Cover is hinged and fitted with Macbeth glass globe. Supplied with standard Hotpoint percolating apparatus and safety switch.

Cat. No. P3
6 Cups

The market for electric percolators, in Canada, has hardly been scratched. Practically every wired home is a prospect. We strongly recommend Electrical Dealers to lay in a stock of Hotpoint Percolators, and feature them in their window displays before the public have bought their Christmas gifts.

"Made in Canada" by

Canadian General Electric Co., Limited

HEAD OFFICE TORONTO

Branch Offices: Halifax, Sydney, St. John, Montreal, Quebec, Cobalt, Ottawa, Hamilton, London, Windsor, South Porcupine, Winnipeg, Calgary, Edmonton, Vancouver, Nelson and Victoria.

Hotpoint

The P2 Hotpoint Percolator is somewhat smaller in size than the P3 having only a five cup capacity. It is of plain design, finished in bright nickel, and silver plated inside. Equipped with standard Hotpoint percolating equipment, and safety switch.

Cat. No. P1
6 Cups

Cat. No. P2
5 Cups

The P1 Hotpoint Percolator is a very inexpensive design of sound workmanship. Made of finest aluminum with standard Hotpoint percolating apparatus and safety switch. This model has a large sale among people who cannot afford the more elaborate types, but, who desire to own a percolator built for service.

Our Christmas advertising campaign will feature Hotpoint Percolators very prominently. The potential market for these appliances is so large that dealers cannot help but make sales, if the proper display is given to this decidedly profitable line.

Complete stocks of Hotpoint Percolators can be obtained from your jobber or our nearest sales branch.

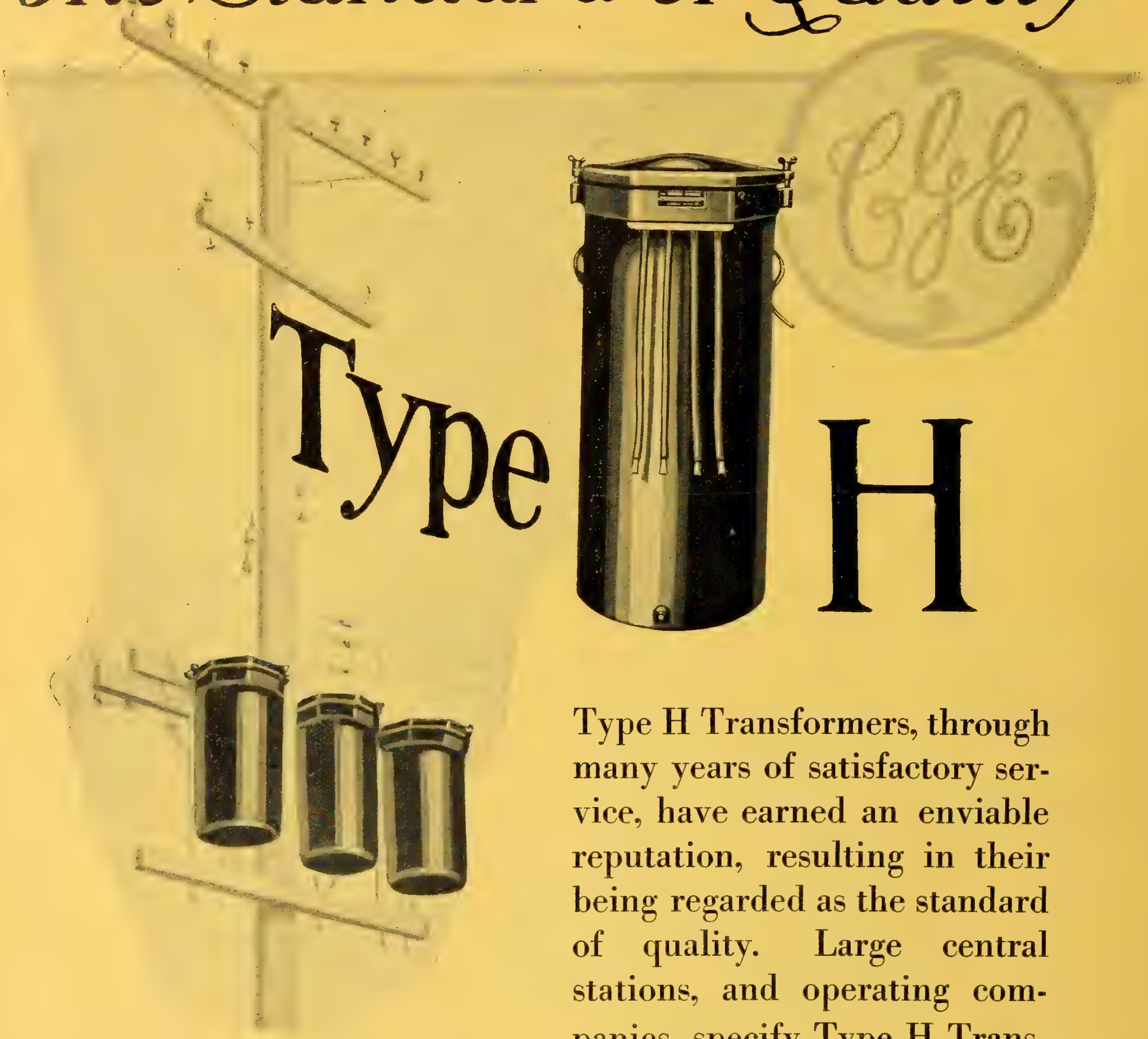
"Made in Canada" by

Canadian General Electric Co., Limited

HEAD OFFICE TORONTO

Branch Offices: Halifax, Sydney, St. John, Montreal, Quebec, Cobalt, Ottawa, Hamilton, London, Windsor, South Porcupine, Winnipeg, Calgary, Edmonton, Vancouver, Nelson and Victoria.

The Standard of Quality



Type H

Type H Transformers, through many years of satisfactory service, have earned an enviable reputation, resulting in their being regarded as the standard of quality. Large central stations, and operating companies, specify Type H Transformers because of their long life, and excellent operating characteristics. Low depreciation rates, and uninterrupted service will eventually win on any system.

"Made in Canada" by

Canadian General Electric Co., Limited

HEAD OFFICE TORONTO

Branch Offices: Halifax, Sydney, St. John, Montreal, Quebec, Cobalt, Ottawa, Hamilton, London, Windsor, South Porcupine, Winnipeg, Calgary, Edmonton, Vancouver, Nelson and Victoria.

What a Prestige There is Back of the Name "Klein"!

And no wonder! Only the finest quality of materials, the finest of workmanship, the most rigid manufacturing specifications, the most careful inspection, is permitted!

Any "old-timer" knows what the Klein trademark means on linemen's tools! Follow their lead and we know you will buy "Klein's."

The quality in Klein Pliers did not just happen! Many are the old employees that for years have been safeguarding in the forging, tempering and inspecting departments, the prestige of the name "Klein." Mr. F. Baumann is one of the old-timers. A few weeks ago he rounded out his **first** 50 years with Klein!

Mathias KLEIN & Sons

Established 1857

Chicago Ill USA

To the Electrical Contractor

Who is busy with contracts in connection with rural distribution

We are now in a position to furnish a complete line of POWER equipment including Robbins & Myers' Motors and Sundh Electric controlling devices. We are also Ontario Sales Agents for Rawlplugs.

May we quote on your requirements?

DOMINION ENGINEERING AGENCY, LIMITED
D. M. Fraser, Pres.
24 Adelaide Street East :-: Toronto, Ont
Montreal Representative: E. W. Playford, 358 Beaver Hall Square

"Turn to the right and back comes your light"

with a

"Repeater-6" Fuse Plug

"Repeater-6" marks the greatest forward step in the history of fuse making. It can be used six times and then refilled at a cost of a few cents. When one fuse blows, simply turn the switch to the right and back comes the power or light.

"Repeater-6" is made in 7 amperages ranging from 6 to 30 and the voltage is 110 to 125.

You can obtain your requirements from the electrical jobber or by writing us direct.

Manufactured by
Repeater Six Fuse Plug Co.
of Canada Limited
BURLINGTON, ONTARIO, CANADA

CHAPMAN ARRESTERS

For Telephone and Telegraph Lines

Weatherproof and Troubleproof

Standard equipment for over fifteen years with some of the most discriminating buyers in the United States and Canada.

Approaching Spring storms make them a necessity to your customers.

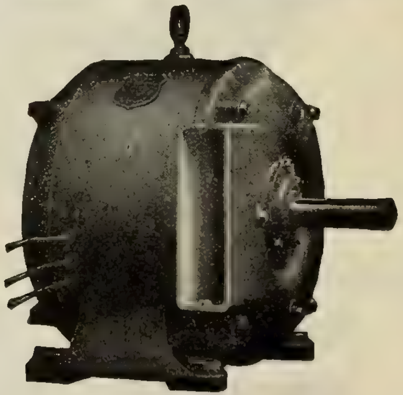
Send for descriptive matter

Minnesota Electric Co.
Minneapolis Minn.

The "Lancashire" Induction Increases Production

LANCASHIRE
BALL BEARING
MOTORS

LANCASHIRE DYNAMO & MOTOR CO. (of Canada) LTD.
TORONTO MONTREAL



Lancashire Pipe-Ventilated Motor. For use in Cement & Flour Mills, etc.

SIMPLEX IRONER

"THE BEST IRONER"

ELECTRICALLY HEATED and DRIVEN
AUTOMATIC FEEDBOARD CONTROL
OPEN END CONSTRUCTION

No woman should do by hand
what a machine can do
better for her

MANUFACTURED BY

CANADIAN IRONING MACHINE CO., LTD.

WOODSTOCK, ONT.

Before you buy

FERRANTI

POLE TYPE

TRANSFORMERS

S. P. Pole Type Transformer, Welded Steel Case and Cast Iron Cover

compare their Efficiency, Exciting Current, Overload Capacity, Light Weight, Insulation Strength and General Construction Details with those of any other type.

Ferranti Transformers merit inspection and the company welcomes it

FERRANTI METER & TRANSFORMER MFG. CO. LIMITED

26 Noble St. TORONTO
128 Bleury St. MONTREAL
Simpson Bldg. HALIFAX
145 Market Ave. WINNIPEG
Northwestern Engineering & Supply Co. CALGARY
Northern Ontario J. P. Bartleman, Timmins

Dominion Insulator & Manufacturing Co., Ltd.

(Division of The Ohio Brass Company)

ANNOUNCES

That it is now constructing a factory at Niagara Falls, Ontario, for the manufacture of the most up-to-date, approved designs of High Tension Porcelain Insulators and other O-B Products, such as Trolley Materials and Rail Bonds for Electric Railways and Mines, Electric Car Equipment and Steam Road Electrification Materials.

The new plant will be of the latest construction and will be equipped with every modern facility for the production of this class of material by the most advanced processes.

The factory will be in production sometime before January 1st, 1923.

"The Bailiff was after me"

"I was busy—night and day—had a bunch of men spread all over town, in fact I had almost come to the conclusion that I was the real Big Guy in the electrical business. My competitors did not seem to have the ability to land jobs against my competition. AND THEN I WOKE UP.

'Jobbers and Manufacturers have a nasty habit of expecting their bills to be paid and every Saturday I had a big pay roll to meet, with the result that I soon found myself in hot water. I knew something was wrong because there was more going out than coming in. After a little figuring it was quite evident that I was taking work and selling goods too cheap. In fact I had been so busy landing jobs that I had clean forgot about such things as Overhead Expense and Profits.

'A Commercial Traveller friend of mine told me about your pricing system and urged me to adopt it. It just took two weeks of its use in my office to prove my previous errors and my only regret is that I did not know of your system a year ago.

'I am not quite so busy now—I very seldom work nights, but I am able to pay my bills. I am rated in Dunns and Bradsteets and I am making money—thanks to the Henderson Business Service. If every Contractor-Dealer in the Country would use your service the Electrical business would outrank any business I know of."

This was the actual experience of an Ontario Electrical Contractor-Dealer as told by himself to our Mr. Henderson a few weeks ago. There are hundreds of others who are just as enthusiastic over our service as this dealer. Many of them have been using it for five years and would feel lost without it.

— Satisfy Yourself —

Surely this service is worth you trying out for at least a year. It must have merits otherwise it would not be in such general use. The cost is only about 10 cents a day and there is not a dealer in the Country who has not at some time experimented with one thing or the other. Even if it proves only one tenth as good as is claimed for it, it is worth 10 cents a day.

Try it ☛
For a Year

The Cost is Only
10c a Day

ORIGINAL

ORDER FORM

ELECTRICAL
RESALE SERVICE

HENDERSON BUSINESS SERVICE, LIMITED
Box 123, Brantford, Ont.

Dear Sirs:— Date..................................

You may enter our order for your Electric Resale Price Service on the following terms and conditions:—

You are to furnish us with a loose-leaf Resale Price Book on Electrical Material as supplied to the Electrical Trade throughout Canada for which we agree to pay you the sum of $36.00. Payment to be made as follows:—$9.00 with this order and three payments of $9.00 each at the end of each 3 months' period following. If any payment becomes 30 days past due the total balance owing is immediately due and payable. We agree to remit the above payments by Money Order and failing to do this, will accept your sight drafts with exchange.

You are to keep this book revised for the next 12 months by sending us whatever Change Sheets are issued from your office.

At the expiration of this 12 months' period you may continue supplying us with the Change Sheets whenever issued, until we notify you 30 days in advance of our wish to discontinue. We Agree to pay you the sum of $3.00 a month for this Service by remitting Money Order each month and failing to do this,will accept your sight draft for $9.00 (with exchange) at the end of every 3 months.

It is distinctly understood that these are suggested Resale Prices and we are under no obligation or Agreement to maintain the prices compiled by you.

Accepted by: Signed ....

Street ....

.... City ....

Order the "Northern" *Heating Pad*

Three heats

Cutler-Hammer Switch

Size 12″x15″

Extra heavy eider-down cover

Washable Slip

The **"Northern"** Pad embodies the very best materials and the highest type of construction.

Place your order for fall selling now. Heating Pad business will be brisk. **"Northern"** Heating Pads are dependable—they are made to last and give satisfaction. **"Northern"** dependable heating pads build business for the dealer through their outstanding quality and reliability and at the same time afford the dealer a handsome profit on each sale.

For Sale Throughout Canada by

Northern Electric Company
LIMITED

Montreal	**Toronto**	**Hamilton**	**Windsor**	**Regina**	**Edmonton**
Halifax	**Quebec**	**London**	**Winnipeg**	**Calgary**	**Vancouver**

Northern Electric Company
226 Sheldon St., Chicago. Ill.

JEWELERS and dentists who have made the mistake of purchasing cheap, underpowered lathe motors, as well as those using foot-powered devices, are live prospects for the dealer who sells R & M dental lathe motors. The large capacity of the motor—1/6 horse-power—its quiet, vibration-free operation, sturdy construction and workmanlike appearance make an immediate appeal, and its price, power and quality considered, is usually an agreeable surprise to the prospective customer.

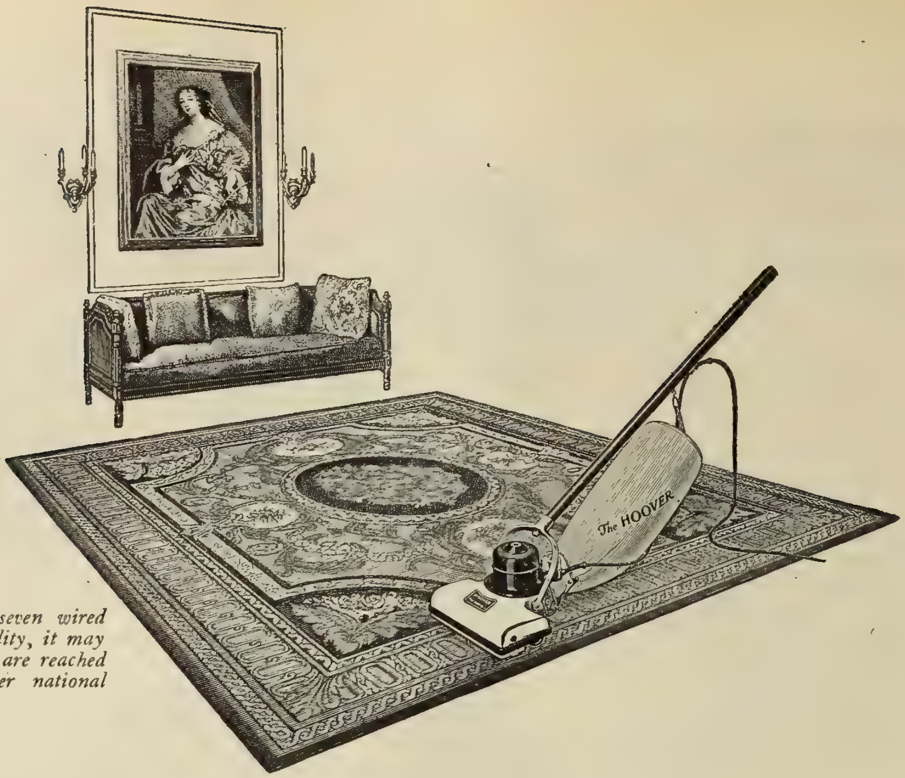
Each motor is supplied complete with cord and plug, chucks, grinding wheels and buffing wheels. In addition to its use for jewelers and dentists, it is a handy outfit for household service.

Jobbers and dealers have found this motor one of the very attractive items in the R & M line. Bulletin on request.

The Robbins & Myers Company of Canada, Limited

Brantford - Ontario

Robbins & Myers Motors



Five out of every seven wired homes in your locality, it may be safely estimated, are reached regularly by Hoover national advertisements

$37,000 Worth of Hoovers Sold in London, Ont., in Eighteen Months

On an average stock investment of only $753, the Public Utilities Commission in eighteen months has sold 517 Hoovers, valued at more than $37,000, in London, Ontario—a city of 13,253 wired homes.

During 1921, 313 Hoovers worth $23,175 were sold; in the first six months of this year the sales were 204 Hoovers worth $14,166. This indicates that 1922 will easily surpass the previous year's record.

Rapid turnovers—in this case twenty-four a year, or twice a month—are characteristic of the Hoover proposition for several reasons.

First, The Hoover is the best known and best advertised cleaner and consequently is a fast seller. Second, we encourage our dealers to order frequently so that they may hold down their investments and turn their stocks often. Third, we back up our dealers with sales and advertising assistance of proved merit.

At London, as in many other cities, the famous Hoover Co-operative Plan is in effect. Under this highly resultful arrangement our trained sales organization, in close co-operation with the dealer, secures leads, demonstrates, sells, delivers and services the machines.

The Public Utilities Commission, in turn, has allotted a prominent main floor location for the Hoover demonstration table. Hoover window displays and local newspaper advertising are also freely used.

Investigate the Hoover proposition. Our representative will gladly call and discuss its various phases with you. Send for him today. There is no obligation.

MEN WANTED
to sell The Hoover

The expansion of our business continually creates openings for alert, energetic young men of good character, appearance and address to be trained as retail Hoover salesmen. Many of our men

Earn $200 to $600 per month

The average runs $200 to $250. Some make $500 to $600, however. It is simply up to the man and how willing he is to be taught the best methods of selling. You sell the best known, best advertised and best cleaner. We train you free and pay you liberally. Excellent opportunities for promotion. Apply in person at Hoover district offices in principal cities (consult phone book)—or by mail to factory. There may be an opening right in your locality

THE HOOVER SUCTION SWEEPER COMPANY OF CANADA, LIMITED
Factory and General Offices: Hamilton, Ontario

The HOOVER
MADE IN CANADA

It BEATS.... as it Sweeps as it Cleans

Electrical News

Generation, Transmission and Application of Electricity

For nearly thirty years the recognized journal for the Electrical Interests of Canada

Published Semi-Monthly By

Hugh C. MacLean Publications
LIMITED
THOMAS S. YOUNG, Toronto, Managing Director
W. R. CARR, Ph.D., Toronto, Managing Editor
HEAD OFFICE - 347 Adelaide Street West, TORONTO
Telephone A. 2700

MONTREAL - - 119 Board of Trade Bldg.
WINNIPEG - - - - 302 Travellers' Bldg.
VANCOUVER - - - - - Winch Building
NEW YORK - - - - - - 296 Broadway
CHICAGO - - - 14 West Washington St.
LONDON, ENG. - - 16 Regent Street S.W.

ADVERTISEMENTS

Orders for advertising should reach the office of publication not later than the 5th and 20th of the month. Changes in advertisements will be made whenever desired, without cost to the advertiser.

SUBSCRIPTIONS

The "Electrical News" will be mailed to subscribers in Canada, Great Britain and British possessions post free, for $2.00 per annum. United States $2.50. Other foreign countries $4.00. Single copies 15 cents. Remit by currency, registered letter, or postal order payable to Hugh C. MacLean Publications Limited.

Subscribers are requested to promptly notify the publishers of failure or delay in delivery of paper.

Authorized by the Postmaster General for Canada, for transmission as second class matter.

Vol. 31 Toronto, October 15, 1922 No. 20

Results Follow United Action

The activity in the sale of electric heaters during the past two weeks is the best evidence we could possibly have of the immediate value of concerted action. Everywhere we turn the electric store window is displaying heaters, until the conception of a cosy evening produced electrically has so fixed itself on the mind of the average householder that he cannot get away from it. He sees it during his office hours or he discusses the coal situation with his business associates; he sees it on the way home as he pictures himself entering a cold, damp house; he sees it as his wife comes forward, shivering, to meet him; he sees it as he sits uneasily at his evening meal and as he vainly tries to settle himself comfortably with his evening pipe and paper. The electrical industry for once has acted in unison and the result is that manufacturers of electric heaters are all flooded with orders, dealers' turnovers are the largest in their history, innumerable wiring jobs have been sold and electricity has made thousands of interested, enthusiastic friends, who will continue to buy electric goods of every kind through the years to come.

The circumstances that assisted in bringing about this condition were somewhat unusual and urgent it is true but, analyzed deliberately, it is probably a fact that the effect of the coal shortage scare was more noticeable on the electrical dealers themselves than on the general public. It awakened the dealer to the possibilities underlying the sale of electric heaters for autumn use and it gave him one added argument. It is not evident, however, that a similiar campaign, equally vigorously and unitedly prosecuted, would not have produced the same results—without the coal shortage. There were sufficient arguments before; only the enthusiasm was lacking.

The lesson to be learned, we believe, is that best results can only follow united action. It is not necessary to wait for special opportunities or special conditions. Now that the heater campaign has proved a success, let's try the same tactics with other household appliances. Take electric washing machines for example.

Suppose every electrical dealer featured nothing in his windows for the next two weeks but electric washing machines, talked washing machines and advertised washing machines so that every where the housewife turned she was confronted with the uncomfortable fact that her way of doing this piece of drudgery was out-of-date and unnecessary slavery. Suppose the man of the house in addition were bombarded with literature picturing the actual slavery of the old washboard as used in his home week after week. Following this up judiciously by personal home calls. Such campaigns carried on locally have sold hundreds of machines per week . Why not sell them in all the towns and cities in Canada at the same time—and rate? "One thing at a time," has been a slogan so long that it has lost some of its force but its truth is as evident as it ever was.

If the electrical industry in Canada will so organize that it can operate as a unit and then, as a unit, concentrate on one appliance at a time, we can have a long series of sales successes equal to that at present under way in electrical heaters.

The Business Papers' Influence

Press Day has become an established feature of the Canadian National Exhibition and the luncheon addresses are notable for the valuable information they invariably impart. At this year's luncheon, Mr. H. T. Hunter, vice-president of the Canadian National Newspapers and Periodicals Association, and speaking more especially for the technical and business publications, stressed the importance, to the Exhibition, of the type of publicity afforded by these publications, due to the selected class of readers they reach. He stated that the circulation of business and technical magazines in Canada was approximately four hundred thousand, composed of readers who looked to these publications for much of the information necessary to enable them to conduct their business along profitable lines and who consequently scrutinized every issue very carefully.

The speaker also referred to the common aims of the Business and Technical Newspapers and of the Canadian National Exhibition. The educational aspect is the most important in each case. Quoting Mr. Hunter, "We are on common ground in educational work. I believe this Exhibition was started primarily for educational purposes and its great success is due to the fact that you have never allowed the amusement side to dominate. I believe the educational features should be given wider publicity. The individual exhibitors do a great deal in this connection but there is much to be done collectively. A few people would come to see a few exhibits of motor cars, but thousands will come when they know there will be seventy exhibitors representing probably 70 per cent of the manufacturers who are seeking Canadian business. In our Association there is a publication for practically every line of business. These publications have told, year by year, the outstanding events of the Exhibition that would be of interest to their readers, and I think we can claim that this has been a factor in increasing interest and attendance of a very desirable class of people."

The further valuable point was emphasized that the exhibition authorities were especially interested in bringing in the men and women who have "a stake in the country—the responsible people, the people of large buying power," in a word, the class of people who read and study business and technical papers. In every line of endeavor our publications reach a very large percentage of business men and women who have come to regard their trade-papers as business associates.

Mr. Hunter's concluding sentence will meet the hearty approval of all members of the Association. "The publications in our Association will be very glad to co-operate with you, not only in organizing exhibitors and inducing them to guarantee the cost of the buildings, but in making the buildings a success after they are erected by bringing to the Exhibition the class of people these exhibitors want to reach. For, after all, the real success of an Exhibition does not consist in large buildings or elaborate exhibits but in the class of people who attend."

Reunion of Engineering Alumni, University of Toronto

A grand reunion of "School" graduates is scheduled to take place on October 27 and 28. The committee in charge has arranged a programme that ensures a large attendance; it includes class luncheons, a dinner dance and the Queen's vs. Varsity game on the 28th. An announcement of the reunion is worded as follows—"These meetings have grown into a golden opportunity to revive old college memories and to renew old friendships. They are becoming part of the School tradition of loyalty and unity.—Come and enjoy yourselves in the old familiar haunts. Carry away with you fresh enthusiasm to build Varsity ideals into business and fresh inspiration to carry on the loyal traditions of the old School." Judging from the favorable comment that is heard among School men in general, this present reunion should prove to be one of the most successful. The old spirit is as strong as ever, and every man that possibly can is going to be there and shout Toike O ike again.

C. D. Schnebly Addresses Toronto Section, A. I. E. E.

A large number of members and visitors were present at the first meeting of the Toronto section of the American Institute of Electrical Engineers, which was held on September 29 in the Electrical Building of the University of Toronto. Mr. F. R. Ewart acted as chairman.

Mr. C. D. Schnebly, of the Northern Electric Co. gave a paper on Automatic Telephony which was well illustrated by lantern slides. He opened his talk by referring to the magnetic system where the subscriber had to crank a generator at his telephone to signal the operator. He then proceeded to outline the operation of the manual system and compard it with the operation of the automatic system. With the use of lantern slides he traced a call from the instant the subscriber lifted the receiver from the hook until the connection was completed, explaining how the dial, relays, switches, etc., functioned to give the party required.

Three methods were shown that could be used in handling automatic to manual and vice versa calls and it was explained how this would be done on the new automatic exchange now being installed in Toronto. How the automatic system took care of all classes of calls such as "Busy", "Don't answer," "Disconnected Numbers," and also pay phones, party lines, etc., was also demonstrated.

In conclusion Mr. Schnebly outlined the growth of the automatic system in Canada and showed slides of the Canadian factory where the equipment is being manufactured for the new Toronto exchange. A very vigorous discussion took place after the paper and the speaker was called upon to answer many questions.

Canada's abundant harvest, as reported from coast to coast, is resulting in cash distribution or credits which will, in all probability, equal, if not surpass, the previous record. This will set into circulation vast funds, approximating $2,000,000,000, and will, inevitably have a marked effect on every line of business.—A. E. Ames & Co.

Hamilton Hydro to Have Model Building

The Hamilton Hydro-electric System has recently purchased the property at 12 King St. East, formerly occupied by the Bank of British North America. This is one of the best sites in the business section of Hamilton. The present building is to be remodelled and a new building will be erected at the rear, of fire proof construction, to contain offices and ware rooms. The alterations and extensions to the building are being supervised by Hutton & Souter, architects & engineers, Bank of Hamilton Building, Hamilton. V. K. Stalford is in charge of the electrical installation and equipment for the architects.

Tenders were called recently for the electrical work and the contract has been awarded to Culley & Breay, King St. West, Hamilton. Some of the chief points of interest in the electrical installation will be:

The service supplying the building will be 3 phase, 2,200 volt, 25 cycles and will enter the building underground to a sub-station. This sub-station will be 12' wide by 27' long. The total installation when completed will consist of five 50 kw. transformers. There will be 100 kw. of electric heating used. A very large show room is to be provided for in a mezzanine floor and balcony, with outlets suitably located for the connection of ranges, ironers and all classes of appliances. Connections will be made by means of 3 wire, flush type plugs at the front of the show room. Facing on King Street large show windows are being provided. Provision is being made in the show room for demonstration of ranges, ironers, etc. When completed this building will be a model central station electrical show room.

Report Quebec Streams Commission

The tenth annual report of the Quebec Streams Commission, which covers the operations of that commission for the year 1921, has just been received. It contains detailed reports of the chief engineer, Mr. O. Lefebvre, on the very varied and extensive operations of the commission throughout the Province of Quebec.

Professor Gill to Hamilton

Prof. I. W. Gill, head of the department of mechanical and electrical engineering at the University of British Columbia, Vancouver, has been appointed principal of the Hamilton Technical School. He will assume his new duties on November 1.

The Application of Electricity in the Manufacturing Industry--8

Majority of Lumber Mills Not Motor-driven—Necessity of Using Wood Waste a Factor—Electrification Has Proved Profitable Where Adopted—Squirrel Cage Motors Largely Used

The lumber industry is just beginning to use electricity. Out of the hundreds of saw mill owners and logging operators in the country, those who are thoroughly convinced of superior efficiency of electrical operation are relatively few in number. However, an encouraging feature of the situation is the fact that many have been coming into the fold recently, and the prospects are that the next few years will see the number greatly added to.

There is no great preponderance of electricity users in either of the main branches of the industry. Here and there we find the logger using electrically driven donkey, locomotive or loader. Somewhat more often there is a sawmill which uses electric motors to drive the various machines, or an electric stacker or yard runabout.

It might reasonably have been expected that the sawmill man would be a large user. The change from steam to electric drive does not involve any radical change in mill methods, and on the surface the advantages of the innovation would appear to be obvious. There are, however, potent reasons for the apparent conservativeness of the mill-owners. Most plants have at their disposal a large quantity of wood waste, the possession of which, and the necessity of disposing of it somehow, make a wood-fuel prime mover a desirable driving force. Thus the reciprocating steam engine has been a general favorite with men who are otherwise forced to pay for power while burning up tons of saw-dust and ends in their waste piles and burners.

Advantages of Electric Drive in Sawmill

Recent installations, however, have demonstrated that in certain cases it pays the mill-owner to install a self-contained plant, in which he burns his waste under properly designed boilers, and uses the steam for the generation of electricity. In such cases a double advantage is secured in that part of the steam may be used for drying or heating purposes.

Other economies effected by electric drive in sawmill operation may be listed as follows:

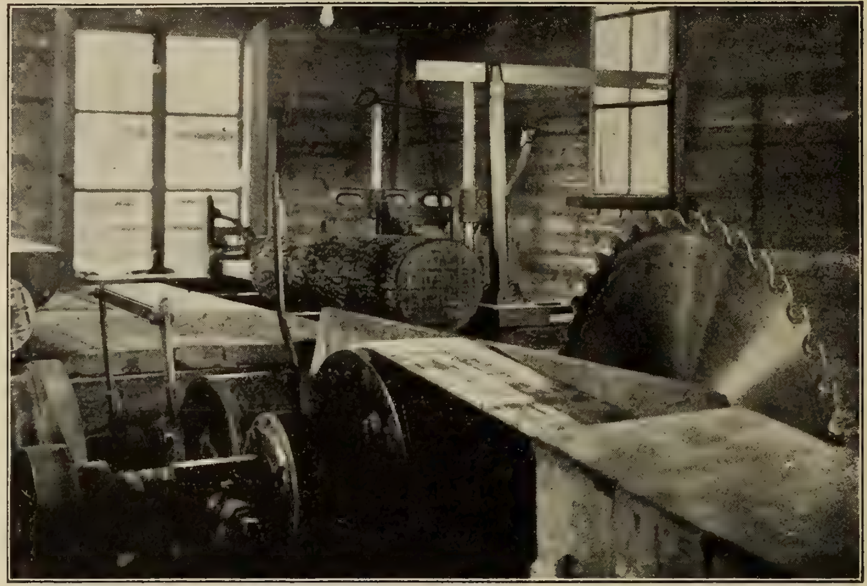
(1) No loss of power turning idle shafting.
(2) Less life hazard from belts.
(3) Economical intermittent operation of machines.
(4) More light due to absence of overhead shafting.
(5) Maintenance costs cut down.
(6) Extensions readily made.
(7) Fans and blower systems easily installed.
(8) High resale value of equipment.

Engineering Considerations

The engineer who is called upon to furnish electrical equipment to a sawmill has an interesting problem. In the first place he has to determine whether it is more economical to purchase power from a central station or to generate it within the plant. In the second he has to determine an advantageous layout of machinery and motors, and in the third and fourth to decide upon how far individual drive is advisable, and what are the best motors for his purpose. The question of illumination is also generally referred to him, and forms an interesting side issue.

The answer to the first and second propositions is determined by local conditions. If there is plenty of cheap power available in the neighborhood, and there is little mill waste, the answer is obvious. In the second case the layout varies with the mill product and the engineer is guided by previous experience. The answer to the third consideration

Gillies' Bros., Plant at Braeside, Ont.—The mill is constructed of steel and concrete throughout—all machinery electrically driven—equipment includes 48 electric motors.



A motor-driven Circular Saw—cutting samples for testing.

is determined largely by what the owners feel like spending on the project, and the type of motor used is settled by the machine requirements.

Lumber cutting is intermittent and, of course, the power required varies in proportion to the size of the cut. Hence the problem is to find a motor that has a long range of efficiency around normal load. The tendency is to overload the motors, with the result that efficiency drops and the running cost amounts to more than it would have cost to instal a larger motor.

Motors Used

The squirrel-cage motor is used for driving the great majority of machines in the lumber mill, particularly edgers, trimmers, slashers, sizers, matchers, hogs, and in general machines that are not subjected to starting under very heavy loads. It is essentially a constant speed machine, and therefore not suitable for applications where a variable speed is required.

The wound-rotor motor is particularly suitable for application where the machines are started under heavy load, such as the log haul gang or resaw, or where speed variation is essential, such as the feed of edgers, cut off saws, and resaws, or rolls used for accurately "spotting" timbers.

Heavy peak loads such as are continually demanded by band mills and edgers are thrown on an engine, there is a slowing down in the entire mill as much as 5 to 7 per cent and sometimes up to 10 per cent on a poorly regulated engine. This cannot occur with individual electric drive, and when these heavy peaks are demanded, the only slowing down will be in the individual machine itself, amounting to the slip of the motor which will not be more than from 2 to 5 per cent.

A comparison of the operating costs of a large number of steam and electrically driven mills shows that there is a decided reduction in the cost of operation. This can be accounted for by a reduction in the number of mill-wrights, oilers and helpers about the mill; saving in renwals of worn-out bearings, belts, etc.; oil, minimum number of shut-downs due to breakdowns, a constant rate of production throughout the entire mill and lower insurance rates.

Less Oil Required

A comparison of the quantity of oil required by steam and electrically driven mills of the same capacities shows that there is a large saving in this item. Oil used in induction motor bearings is used over and over again, whereas oil used on line shaft bearings is used once and they require oiling every day.

The Wiring Installation

A proper wiring installation for a mill should have the wires run in conduit because conduit gives the insulation permanent protection from dust and from moisture, such an installation prevents tendency of open wiring to sag and will last as long as the mill building. Incandescent lamps should be covered by wire guards and large diffusing light units hung high above the plane of work should supplant the drop cord and bare lamps. Such a wiring system in a mill will cut down the bill for insurance and deliver a maximum of illumination with a minimum consumption of electrical energy.

Typical Mills

The plant of Gillies Bros., Limited, at Braeside, Ont., is an interesting example of complete electrification. The mill has a capacity of 150,000 feet a day. It is of reinforced concrete construction, with trussed steel roof.

The power house is a separate brick and concrete building 50 by 80 feet, and contains five 72 inch tubular boilers. These are equipped with Dutch ovens, which are fed by gravity from an overhead conveyor that delivers all the sawdust and log chips from the mill. In the engine-room adjoining the main power unit is an Allis-Chalmers condensing turbo-generator of 500 kv.a. As a precaution, there is an auxiliary connection to the system of the Galetta Electric Power and Milling Co., so that in the event of breakdown a certain amount of power can be obtained.

Each of the three band saws is operated by a 150 h.p. slip ring motor and the band resaw by a 100 h.p. motor.

At the top of the jack ladder the logs are measured as they come up and the jacker operates steam kickers which throw the logs in the different decks for the band saws. At the immediate left there is a chain transfer which carries the medium-sized logs to one band well. To the shorter deck on the same side of the log chain, but farther back, are forwarded all the small logs to supply the centre band mill where some of the very small ones are split in the middle and sent on live rolls and transfers back to the 7-foot horizontal band resaw, which takes care of all slabs. There are three Clark Bros. edgers in the plant, two being single, with three saws, and the third a double 2-man edger, with six saws. The motors driving these are direct connected, the rotors being keyed to the arbors.

An interesting sidelight on the value of electrification is revealed when it is known that since the adoption of this form of motive power, combined with the fireproof character of the plant, the insurance rate has been reduced from $4.50 to 35 cents per $100.

Canadian Western Lumber Company.

The Canadian Western Lumber Company's plant on the Fraser River uses electric power as follows:

Cedar sawmill	918.5 h.p.
No. 1 planing mill	917.5 h.p.
No. 2 planing mill	544.0 h.p.
Finishing shed	395.0 h.p.
Shingle mill	480.5 h.p.
Sash and door factory	315.5 h.p.
Veneer plant	153.5 h.p.
Isolated machinery and yard equipment	571.0 h.p.
Plant lighting	207.0 h.p.
Town lighting	260.0 h.p.
Total	4,762.5 h.p.

This is one of the largest electrically equipped saw mills in the world. There are over 200 motors ranging up to 250 h.p. in size. Squirrel cage and slip ring type are used and the system load factor is approximately 80 per cent. The planing mills, including 620 h.p. in fans, operate at a particularly high load factor. Individual drive is used except where fluctuating load conditions in several machines of a kind make grouping advisable to maintain a steady load on the motor.

Power-Factor Correction

An average power-factor of 82 per cent was obtained on the original installation. Since then two 350 kv.a., synchronous condensers have been installed, with the result that the power-factor has been raised to over 90 per cent.

Power is generated within the plant and is furnished from a set of turbo-generators. Steam is supplied from a battery of tubular boilers, which are fired exclusively with plant waste.

The switchboard is composed of 11 panels. A swinging bracket carries exciter voltmeter and synchronoscope, and tirril regulator. Each main generator panel is equipped with three main ammeters, a voltmeter, a field ammeter and an indicating wattmeter.

The plant of the L. H. Heaps & Co., Ltd., Ruskin, B. C. is also completely electrically driven. In this case power is brought from a central station about seven miles distant. Transmission is carried out at 12,000 volts. The power is stepped down by a 1,000 kw. bank of transformers. There is over 1,500 h.p. of motors installed and very little operation trouble is experienced.

Opportunities for Electrification

At the present time the electrification of lumber mills appears to present one of the greatest opportunities for the electrical industry. The total capital invested in the lumber industry in Canada amounts to $234,793,646, of which approximately one half is represented by mills. Here we have a figure of $117,396,823 in lumber mills alone.

This is represented by over 2,500 sawmills, scattered over the whole of Canada. These are not all of large size, but they all use power of one kind and another. Out of these 2,500 mills, not five per cent are electrified. The tide seems to be turning, owners are becoming convinced of the manifold advantages of electric drive. What remains to be done is to go after them intensively and make two of Canada's greatest basic resources, her water power and her great forests, each a help to the development of the other.

An electrically driven lumber shfter

In our next issue an account will be given of the uses of electricity in the logging end of the industry.

Exportation of Electric Energy from Canada

The table given below, taken from a statement of the Department of Trade and Commerce, Ottawa, just published, gives some interesting figures relative to the production and exportation of electric energy in Canada for the year ending March 31, 1922. It will be noted that the totals given are applicable only to those concerns which export power and do not include the large number of central stations which provide energy for domestic consumption only.

	Units Produced for Export		Units Produced for Use in Canada		Total Output of Generating Station or Other Source	
Central Stations	Kw. hours	H.P. years	Kw. hours	H.P. years	Kw. hours	H.P. years
Ontario Power Co.	304,244,400	46,453	483,439,300	73,989	787,662,700	119,442
Toronto Power Co.	102,122,000	15,629	553,463,500	81,703	635,585,500	97,332
Cedar Rapids Mfg. & Power Co.	324,193,000	49,592	310,500	40,913	591,493,500	90,505
Can. Niagara Power Co.	82,264,000	12,590	393,881,000	60,026	476,145,000	73,616
West Kootenay Power & Light Co.	2,084,900	318	182,384,100	27,891	184,469,000	28,209
Western Canada Power Co.	24,825,300	3,594	82,502,380	12,625	107,327,680	16,219
Ontario & Minnesota Power Co.	12,729,010	1,939	12,254,149	1,873	24,983,159	3,812
British Columbia Electric Ry. Co.	419,692	64	133,020,093	2,035	133,439,785	2,099
Maine & New Brunswick Electric Power Co.	8,460,291	1,296	392,463	61	8,852,754	1,357
Sherbrooke Ry. & Power Co.	252,200	36	5,391,730	826	5,663,930	862
Totals	861,594,793	131,511	2,114,039,211	301,942	2,955,623,008	433,453

Is the Range and Water Heater Load Profitable to the Central Station?*

Successful Development of Cooking Load Depends upon Satisfactory Solution of Water-heating Problem—Alternate Use of Range and Water-heater Suggested—Average Revenue That Must Be Received

"Profitableness of range load" is a different subject from "profitableness of range and water heater load." For the range load there is a pretty clear case. The water heater alone looks hopeless. The range and water heater combination presents a problem, but also supplies some of the means for its solution, and it is far from hopeless.

The cost of power delivered to the distribution system at the substation will average around $57 per kilowatt-year. From this point on the investment per customer and the operating cost will vary more or less with the class of service.

Range Loads

It is necessary to install 3 kw. in transformer capacity for single ranges, 5 kw. for two ranges, 7.5 kw. for four ranges and 1.5 kw. per range where more than four are connected to one transformer . In one instance a 25-kw. transformer having a connected load of fourteen ranges and ten 1-kw. water heaters showed a maximum load of 30 kw. for a period of twenty-five months and loads slightly in excess of normal for short periods each day, never exceeding twenty-five minutes.

In adding range load to the ordinary distribution system there is required an average additional investment in the distribution system of about $75 per range, making an annual investment cost of $9 per range. Distribution operating costs will average $6 per kilowatt and the commercial and general expense or customer costs will average $7.50 per customer.

Various group tests show that the average range contributes approximately 1.22 kw. to the total simultaneous demand on the distribution system. This average demand of 1.22 kw. is the result of diversity among cooking customers, but there is also a diversity between this demand and the demand of other classes of customers which we have not yet taken into account and which will further reduce the total simultaneous demand on the station.

Investigations indicate that the average range demand on the station is thus reduced from 0.6 kw. to 0.9 kw.

For the purpose of this discussion we will be conservative and assume 0.9 kw. On this basis the annual cost of service per range is:

Cost of power delivered at the sub-station	$51.30
Distribution investment cost	8.10
Distribution operating and maintenance	5.40
Customer costs	7.50
Total	$27.30

The average annual kilowatt-hour consumption per range is about 1,700 kw.h. and the cost per kw.h. is then 4.3 cents.

Water Heating Involved

The successful development of electric cooking is dependent upon some satisfactory solution of the water-heating problem. This problem, however, is fraught with no little difficulty, for water heating in proportion to the power required is a low-value service, and moreover, the load factor is such as to leave no room for dividing the cost with any other class of service. Naturally the greatest convenience to the customer is supplied by unlimited service, but it costs more to furnish such service than it is worth to the residence customer.

Several methods have been suggested for limiting the water-heater load. None of them has been very thoroughly tried out in practice, but the most effective and seemingly most workable method yet proposed is the installation of a double-throw switch separating the range and water-heater and alternating their use.

One Service and one Meter

It is assumed now that a universal residence service rate is in effect, and that we are delivering power for any and all purposes in the residence through one service and measuring through one meter, thereby reducing the investment and maintenance cost of services and meters. It is also assumed that the range and water heater are required to be connected for alternate use only. What average revenue must we receive from residences using lighting, cooking and water heating in order to pay the cost of service? The total simultaneous demand based on the average customer is:

	Kw.
Lighting	0.25
Cooking	0.9
Water heating	0.5
Total	1.65

The annual cost of service is then:

Cost of power delivered at sub-station	$94.05
Distribution investment cost—12 per cent of $125 × 1.65	24.75
Distribution operating and maintenance	9.90
Customer costs	7.50
Total annual cost	$136.20

Or a total of $11.35 per month. The average kilowatt-hour consumption is:

	Annual	Monthly
Lighting	250	21
Cooking	1,700	141
Water heating (20 hours per day)	7,200	600
Total	9,150	762

This is an average cost of 1½ cents per kilowatt-hour. Or if the water heater be connected ahead of the meter and charged at $4 per month, the lighting and cooking must pay the remaining $88.20 per year, or an average of 4.5 cents per kilowatt-hour.

The natural division of this cost based on average use is:

	Per Month	Per Kw.h. Cents
Lighting and appliances	$2.25	9.00
Cooking	5.10	3.00
Water heating	4.00	0.55
Total and average	$11.35	1.5

(Concluded on page 39)

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*From a paper presented at the Northwest Electric Light Association convention, Boise, Idaho, June 7 to 10, 1922.

Electric Steam Generators and Their Application

Cost of Electric Energy for Steam Generation—One Kilowatt Hour Produces 3.1 Pounds of Steam — Three Phase Power Used—Superheater and Relay Systems

By P. S. GREGORY*

The production of steam by means of electric energy is not a new process, and the water resistance type of electric steam generator has been in use in Europe for some fifteen years, though in the majority of installations in small sizes only, of 1,000 kw. or less.

In general the cost of electric energy is such that it cannot be used commercially for the production of steam, but there are circumstances under which the conversion of electric energy into steam, even on a large scale, becomes economically feasible. The required conditions are a surplus amount of electric power, for which there is no other use at certain times, or a cheap supply of power. One or other of these conditions frequently exists in industrial plants. All manufacturers who purchase their power on a flat rate basis have at certain times in the day, or on certain days in the month, power available for which they have paid under their contract, but of which no use is made. The saving of coal which can be effected by the conversion of such surplus power into steam is a subject worthy of careful consideration.

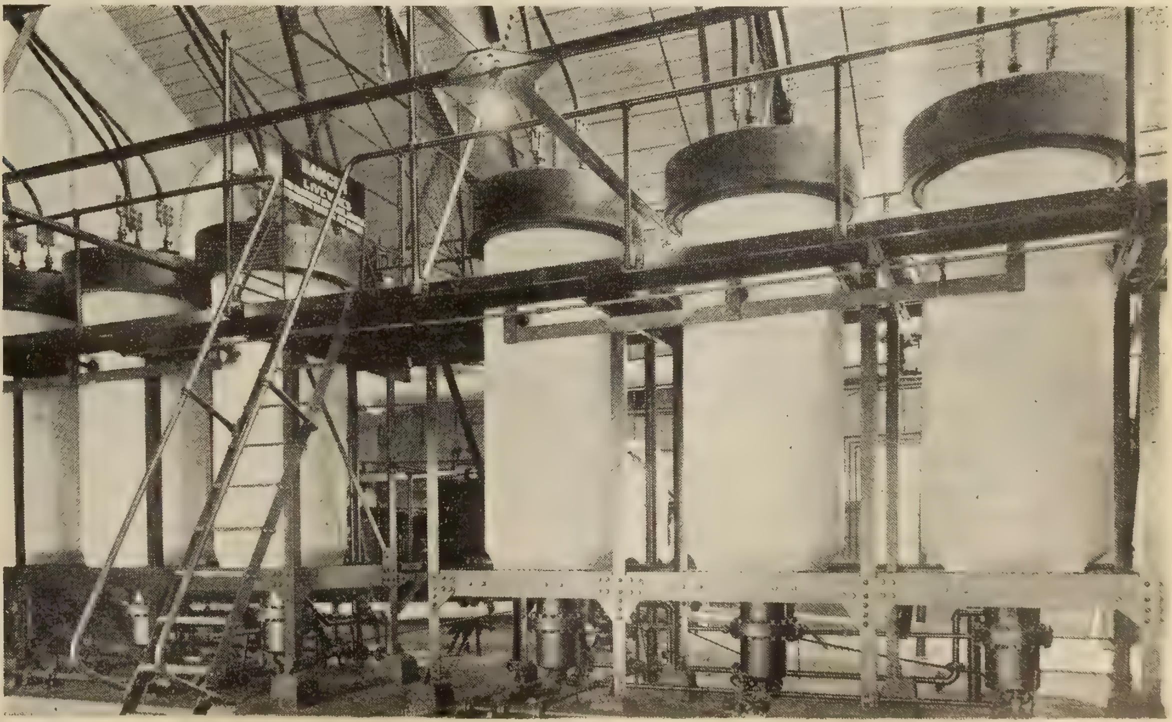
Relationship Between Electric Energy and Heat

The fundamental relationship between electric energy and heat energy as pertaining to the production of steam may be stated as follows: One kw.h. is equal to 3,412 British thermal units. In order to produce one pound of steam at a gauge pressure of 100 lb. per sq. in. from feed water having in initial temperature of 150° F., 1,070 B.t.u. are required. Therefore, if the conversion of electric energy into steam can be made at an efficiency of 97.5 per cent one kw.h. will produce 3.1 pounds of steam at the above conditions of temperature.

Under average conditions 1 pound of coal in a boiler will produce about 7.5 pounds of steam and therefore, the electric energy which is equivalent to one ton of coal is 15,000/3.1=4840 kw.h. This is equivalent to approximately 200 kw. for 24 hours, so that for each ton of coal per day to be replaced by electric energy, about 200 kw. of electric steam generator capacity is necessary. On the basis of 4,840 kw.h. being equivalent to one ton of coal, which is valued at say $8 under the boiler, the price which could be paid for electric energy would be 1.65 mils per kw.h. If there fore, a supply of power is available at a price not greater than 1.65 mils per kw.h. in a plant where coal costs $8 per ton or more, the production of steam by electric power is commercially feasible.

Electric Steam Generator Construction

The water resistance electric steam generator consists essentially of a closed pressure vessel to which is connected a source of water supply, and from which water may be drawn off at the bottom and steam at the top. In this vessel electric energy is made to flow through the water from an electrode in the form of a plate, or tube, to the shell of the shell of the vessel, or to the metallic inner lining. Alternating current energy is used at a pressure varying from 110 up to 12,000 volts. The generators are constructed for the use of 3-phase power, either by employing three elec-



View of electric steam generators in plant of Laurentide Co. Ltd., Grand Mere, Que.

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*Before American Electrochemical Society, Montreal, Sept., 1922.

trodes in one vessel, or by the use of three vessels with one electrode in each, in which case the outer shells are connected together in star. In this type of generator there is no heating surface, the generation of steam taking place throughout the water, and as a consequence no portion of the apparatus is at a higher temperature than the temperature of the steam. This is a most important feature from the viewpoint of safety and continuity of operation, as can be readily appreciated.

The chief advantages of the water resistance type of steam generator over the metallic resistance type are freedom from electrical and mechanical troubles, ease of regulation and cheapness. This type of generator has recently been further developed and made applicable to conditions on this continent by Mr. F. T. Kaelin, chief engineer of the Shawinigan Water and Power Co. Units of Mr. Kaelin's design, manufactured by the Dominion Engineering Works, Limited, Lachine, Que., and the Electric Furnace Construction Company, Philadelphia, Pa., are in operation up to 25,000 kw. capacity. A full description of this type of generator is given in Mr. Kaelin's paper, read before the Montreal section of the Society of Chemical Industry, the Engineering Institute of Canada and the Canadian Institute of Mining and Metallurgy, on January 19, 1922. A low voltage type of water resistance generator was described at the fortieth general meeting of the American Electrochemical Society in October, 1921, by Messrs. Lidbury and Stamps.

Operation of Generator

In the operation of this type of generator the load or electrical input is dependent directly upon the area of electrode immersed in water, and inversely upon the resistance of the water. The variation of the water level or the area of immersion is affected by the operation of the valve in the feed water supply line. The resistance of water decreases with temperature, the relation being expressed by the formula.*

$$R = C \div \sqrt[5]{T^4}$$

in which R=ohms per cubic inch, T is the temperature in °C, and C is a constant having a value of about 42,000 for raw river water, and about 87,000 for condensate containing 25 per cent of make-up water.

The variation of the resistance of the water is effected by controlling the amount of water bled from the bottom of the generator. This water contains a comparatively high percentage of salts, and is therefore of a low resistance, so that an increase in the amount of water bled from the generator means on increase in the resistance of the remaining water and consequently a decrease in the load.

In actual operation it has been found that for ordinary fluctuations of load, such as are obtained in paper mills, a practical method of operation is to maintain a constant water level, and to vary the output of the generator by varying the resistance of the water by means of a bleeder valve.

Present Installation 150,000 kw.

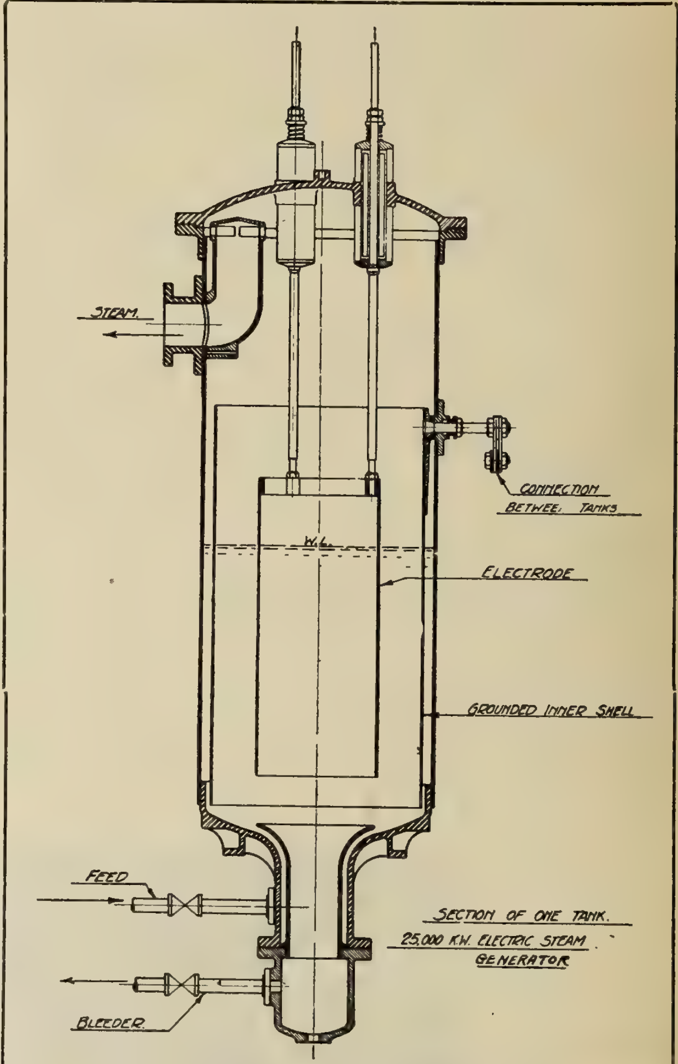
There are in operation in Canada and in the United States at the present time installations of electric steam generators totalling about 150,000 kw., which are for the most part installed in paper plants. One of these units is shown in the illustration below.

The accompanying diagrams illustrate the present development of the electric steam generator.

Fig. 1 shows a cross section of one of the three tanks of a 25,000 kw., 6,600-volt unit. The electrode is supported at three points to give mechanical stiffness. The feed water is deflected around the sides of the tank by the funnel shaped casting shown in the bottom of the tank. It is found in operation that this method improves the circulation of water in the generator, and consequently lessens the tendency to prime. The inner shells are separated from the main walls of the vessel, so that even in the event of an electric arc being established between the electrodes and this inner shell, and damaging the inner shell, no weakening of the outer wall would occur.

Use of Super-Heater

A super-heater may be used by means of which about 50° of super-heat may be given to the steam. The principle of the super-heater is as follows: Steam is generated at a pressure of 300 lb. and is fed into the super-heater, flowing outside of the super-heater tubes. It is then passed through a reducing valve, which reduces it to 150 lb. pressure, and it is fed into the super-heater again, passing inside the super-heater tubes and thence to the main steam line. The steam at 150 lb. pressure inside the tubes, being at 366° F., absorbs heat from the 300 lb. pressure steam outside the tubes, which is at a temperature of 420° F., and passes to the main steam line in a super-heated condition. The condensate from the super-heater is drained back into the boiler feed. In a super-heater designed to super-heat 20,000 lb. of steam per hour at 150 lb. pressure from 2 per cent moisture to 50° of super-heat the total heat to be transfered was 616,000 B.ut. per hour. The mean temperature difference was 30° F., and the heat transferred per square foot of heating surface per degree temperature dif-



Section of 25,000 Kw. Electric Steam generator ference was 68.5 B.t.u. per hour. The electrical energy required at 90 per cent efficiency was 180 kw. The advantage of this type of super-heater is that the amount of superheat produced is constant, and that there is no overheating of the super-heater in case only a small amount of steam is being drawn from the generator.

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*The Generation of Steam by Electricity by F. T. Kaelin.

Pressure Regulating Control

Generators are also fitted with a pressure regulating system of control, so that the operation is automatic and no attendant is required. The principle of operation is as follows:

Under normal running conditions the pressure regulator valve on the feed line. which is actuated by the pressure in the generator is open. If the steam consumption is reduced so that the steam supply exceeds the demand, the pressure will rise, and owing to the operation of the pressure regulator valve in the feed control, the amount of water fed to the generator will be reduced, and the water level in the generator will gradually sink. This may continue until a water level is reached at which the float valve opens in the bleeder line, allowing a quantity of impure high conductivity water to be drawn off from the bottom of the tank. This will have the effect of increasing the resistance of the remaining water as well as still further reducing the water level and therefore of cutting down the flow of current until the supply of steam becomes only equal to the demand, and the pressure regulator valve is operated by the reduction in pressure and opens allowing more water to flow into the generator, gradually raising the water level.

The float valve in the bleeder line is closed by the rising water level, which after one or more cycles of operation will finally attain a position such that, for the particular conductivity of the water in the generator, will produce a steam supply equal to the demand.

If, on the other hand, the demand for steam exceeds the supply, the pressure in the generator will drop, and the pressure regulator valve in the feed line will therefore be opened wide and allow more water to flow into the generator, raising the water level, and consequently increasing the steam supply until the pressure rises sufficiently to close slightly the pressure regulating valve, adjusting the inflow of water to the outflow of steam.

The possibility of the water level rising too high in the generator is avoided by the high level float valve in in the feed line, which shuts off the water supply when the water level reaches the top of the electrodes.

A generator fitted with this system of automatic control, has been designed to supply low pressure steam for the heating of buildings. As the heating system is a closed system, the condensate being returned to the generator, it was not necessary to install a bleeder control valve on the heating generator.

Application of Relay System

The development of electric relay systems for the control of steam generators has kept pace with the other developments.

In the operation of the water resistance steam generator the ordinary bugbear of low water has no terrors, but should an electric arc become established between one of the electrodes and the wall of the vessel, a dangerous condition would at once arise. This possible source of trouble has been avoided in two ways—by the installation of an inner protective shell separated from the outer wall by an inch or more, and by the development of a potential balance relay system by means of which should a ground occur on any one of the phases, the main circuit breaker is immediately opened. The opening of the circuit breaker does not depend upon the load on the generator, but only upon the potential balance, and the relay will function equally well from no load to full load, which is a very important consideration.

The complete electric relay system installer in connection with one of the larger units is illustrated in Fig. 4. The relays consist of the ordinary overload relays, the potential balance ground protection relays and an emergency hand-operated relay trip.

In order to make possible the application of the electric steam generator under conditions where a fixed amount of power is purchased, which is not all utilized in manufacturing operations, a relay system has been developed which will govern a total amount of power taken by the consumer, and will insure that all power not otherwise required will be utilized in the electric generator.

The principle of operation consists in cutting in or out the feed water supply to the generator by means of the overload relays, which are operated by the total power consumed. The relays are so arranged that once the feed water is cut out it will not be cut in again until the total demand has been reduced some 10 per cent below the contract amount. The shape of load curve obtained with a generator controlled by this type of relay system is therefore, saw-toothed, and the relays can be so designed that the amount of available energy which is unused is less than 5 per cent of the total energy purchased.

In conclusion it must be pointed out that the water resistance type of electric steam generator has now been developed to such a point that there is on the market today an apparatus suitable for the conversion of surplus electric energy into steam under almost any given conditions. Furthermore, in cases where power is cheap, or where fuel is expensive, or in special industrial processes, the electric steam generator can economically replace the coal-fired boiler.

Are Range and Water Heater Loads Profitable?

(Concluded from page 36)

With our present average load factors this is what it costs, but the cost per kilowatt-hour goes down nearly in proportion to the increase in the load factor, and utility companies can therefore offer very attractive inducements for increased load factor of residence business. The addition of cooking load to any ordinary central-station system will increase the load factor, and the value of the service will guarantee an average of 3 cents per kilowatt-hour. It is. therefore, profitable business to take on, even when accompanied by that evil but necessary companion, the water heater.

Two golden opportunities are open, however, for increased profits: Cut down costs by adopting the one-meter universal residence service plan. Deliver more service at the same expense by increasing the customer's load factor.

First Coal Mine Figures

First reports from the United States coal mines indicate a healthy resumption of production, although both anthracite and bituminous for August were still considerably below normal figures. The output of bituminous coal in August totaled 25,800,000 tons compared with 7,000,000 tons in July, and 34,548,000 tons in August, 1921. Anthracite production, 161,000 tons, showed no substantial change from the preceding months, since mining was not resumed until September. By-product coke production, however, suffered a decline, although beehive increased. The by-product production figures for August, 1922 July, 1922, and August, 1921, respectively are: 1,794,000 tons, 2,486,000 tons, 1,383,000 tons.

Seven-cent Fare Cuts Down St. Thomas Street Railway Deficit

The first month's operation of the St. Thomas city street cars with the seven-cent fare in vogue has proven highly satisfactory to the department and the experiment will be continued for another month at least, Manager Charles Johns reported to the City Council recently. The total operating deficit for the period from August 26 to September 26 was $116.03, the smallest monthly deficit on record. The deficit for August of this year with the straight five-cent fare charged, was nearly $600, while the deficit in September, 1921, was nearly $1,000.

In addition, the operation under the increased fare showed an increase in passengers carried per car mile. A total of 42,770 passengers were carried during the last period, as against 59,064 in September 1921. The figures presented to the council did not include the patronage for Wednesday, September 26, when nearly 4,000 fares were registered.

Deficit for Year Reduced

The operating deficit for the first nine months of the year was approximately $5,000. The operating deficit last year was nearly $20,000.

The receipts for the August 26 to September 26 period totalled $2,455.81 and expenditures $2,571.84. The power bill for the preceding period was $395.98; watchmen's wages, $135.59; operating wages, $997.27; barn wages. $333.90; track wages, $166.38; line wages, $59.80; salaries, $198.33.

Cash fares for the period were $1,274.01 as against $1,092.62 in September 1921, an increase of $181.39; ticket sales were $1,176.75 as against $1,492 last year, a decrease of $316.25.

Car Mile Cost Comparisons

The cost per car mile of operating the cars during the 1922 August period was 23.3 cents as against 22.9 cents during the September period. The cost per passenger per mile was 8.8 cents in August as against 8.4 in September; the revenue per car mile, 13.9 in August in comparison to 15.7 in September and the passengers carried per car mile, 2.65 in August as against 2.74 in September. The total number of car miles operated during the September period was 15,600.

Bus Question Again Deferred

The question of supplementing the street car service with motor buses was again briefly discussed at the meeting but decision postponed, the consensus of opinion being that the seven-cent fare operation had not had a fair trial and no further changes should be made until the new system had been fully tested.

Manager Johns reported that a salesman for a bus manufacturing firm had been in the city and had claimed that their bus could be operated at 15 cents per car mile.

Come to the Convention, Nov. 13 and 14.

Electrification of Stave Lake Railway

The British Columbia Electric Ry. Co., is electrifying its Stave Lake railway which connects the Stave Lake power plant with the C.P.R., at Ruskin, B.C. The line is about 6 miles long, and besides being used in the past for hauling logs from the lake above, will be used extensively for hauling gravel during the building of the new dam at the power plant. Power will be supplied from one sub-station, containing 3 transformers and one 400 kw. motor generator set. Electric locomotives from the company's interurban system will be used and the 2 steam locomotives will be sold. Passenger service is now given by a gasoline car. The company's plan calls for a second development, lower down the river than the first plant, in a few years, and when that is proceeded with the present railway will be submerged. The work, therefore, is of a more or less temporary nature.

New Portable Measuring Instrument

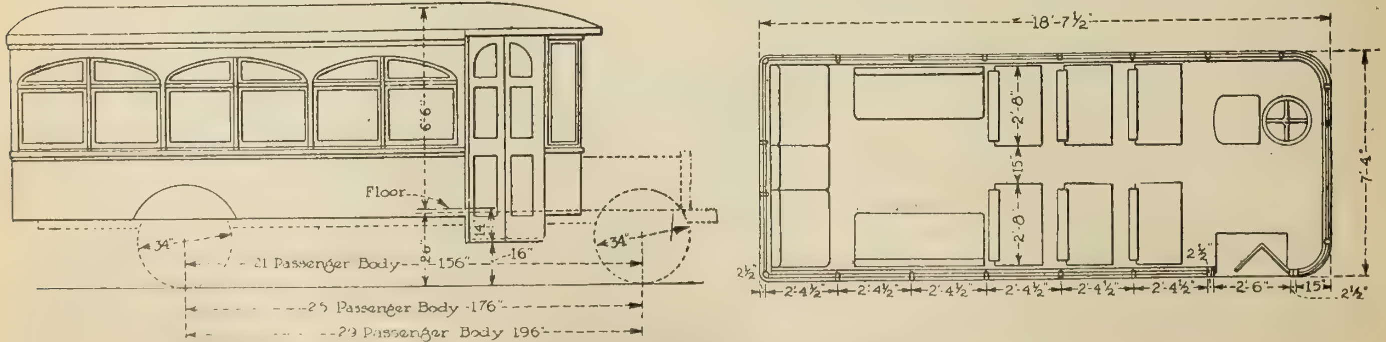
Portable ammeters and voltmeters of a new type, of which compactness, ruggedness, simplicity of construction, and accuracy are claimed as important features, have been added to the line of instruments made by the Westinghouse Electric & Manufacturing Company. The instruments, known as Type PX-3, are direct reading meters for general testing purposes. The field of their application is wide, including central station analysis tests; trade school, high school, and college equipment tests; and battery apparatus tests. They are particularly well suited for automobile and battery testing. A set of six of these instruments is not as bulky to carry as one ordinary large portable instrument.

Standard Motor Bus Construction Proposed

Tentative plans for standard motor bus construction have been drawn up by the American Electric Railway Association. Motors are preferably of either poppet or sleeve valve type, with maximum speed not to exceed 1,300 r.p.m. This development is felt to mark a definite effort on the part of street railways to enter the bus field. The proposed dimensions are given in the accompanying table:

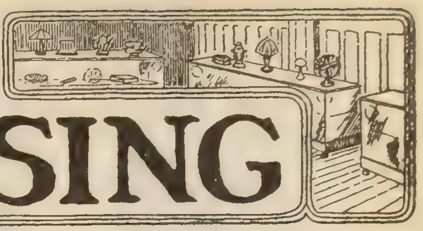
Number of passengers	21	25	29
Wheelbase (inches)	156	176	196
Engine (horsepower)	30	40	50
Tread, front and rear (inches)	66	66	66
Capacity of rear (tons)	2	2½	3
Braking surface (sq. in.)	150	175	200
Approx. maximum weight (lb.)	4,500	5,000	5,500

Other recommendations are: (a) Low-hung type of chassis frame with a maximum frame height of 26 inches, preferaby lower. (b) Spring suspension. (c) Engine, preferably of either poppet or sleeve valve type, with maximum speed not to exceed 1,300 r.p.m. (d) Gear ratio not to be less than 7 to 1, and not more than 12 to 1. (e) Metal plate or spoke wheels. (f) 34-inch solid or semi-solid tires; pneumatics where low floor heights not desired.



Plan of proposed standard motor bus construction

BETTER MERCHANDISING



All Together

Some one has defined success as "Concentration plus Opportunity."

The success of the present sales campaign on Electric Heaters bears this out.

But in one important respect the electrical industry differs from most—there is ***no need to wait*** for the opportunity.

The opportunity is always present.

Then, all that is needed is ***concentration.***

One thing at a time—Electric Heaters today; Washing Machines in November; an Electrical Christmas in December; Good Lighting in January, and so on.

The opportunity is always here; let's grasp it, ***together.***

All together, but—one thing at a time!

The Emancipation of Washboard Slaves

A Wonderful Opportunitv for the Electric Merchant—90 per cent. of Our Housewives Still Under the Yoke—A Few "How-I-did-its" and Several Rounds of Ammunition for Future Use

There are several factors that make the electric washing machine field attractive to the merchandiser who pushes this end of his business. In the first place, a large amount of money is being spent by manufacturers in the education of the housewife to its advantages. In the second, there are plenty of advertising and display helps available, and in the third, a steady turnover of machines means a constant inflow of profit.

The only trouble is that turnover has not been as great, in many cases, as it should have been—the necessary punch has been lacking. The fault is partly in the sales methods adopted, and it is the purpose of this article to outline some sales plans that have proved successful.

Knocking Does Not Sell Machines

At the outset of the discussion, it seems that a few general remarks on the subject of "knocking" will not be out of place. This habit is a prevalent one—almost any electrical show or exhibition demonstrates the fact—that it always works as a boomerang. Right now there are over 100 manufacturers putting machines on the market. These are all ramifications of either the cylinder, oscillating, dolly or suction type of washer, and the prospect is likely to become bewildered in making a choice. When he hears the cylinder type man lambasting the oscillator, the man selling the suction type panning the dolly type, and so on, he tends to think there is something wrong with all of them and either does not buy or is only sold with great difficulty and waste of time.

Tell Them What the Machine Will Do

The time that salesmen spend throwing hammers at each other's machines should be spent in telling what the machine will do. The buyer is interested in that point and when he is told how well the machine washes clothes and at what saving of backaches and labor it gives him a desire for possession. This applies to women especially—they are not mechanics and never will be and the mechanical features of one machine as compared with any other machine, do not particularly interest them. What they want to know is "Will this machine save me anything in time and labor and will it wash my clothes clean?" The woman who believes that a machine will do that for her is sold. She is blissfully ignorant of, and does not want to know anything about, the motor, or the wonderful metal in the tub or the phosphor-bronze gears. Those points may be used with her husband, or told her after she is sold, but it is a mistake to expect that she is going to be impressed by them. She is, of course, very much interested in its ease of operation and safety features and these should be used to arouse her interest.

Tom Jones Never Loses A Chance

The dealer should be working all the time to lay the foundation for future sales. Washing machines require as much sales effort as anything he handles, but adequate preparatory work makes it easier.

Let us suppose that Tom Jones keeps his washing machine well up to the front of the store. It has the best place there is, lots of room to itself, right where everyone coming in has to pass by. That is one point in the game . The next is that he never misses a chance to show off its good points. Mrs Prospect perhaps pauses before the door to take a look at the machine. Jones is right on the job with some such remark as "That machine is a pleasing design, isn't it" and proceeds to put it through its paces for her benefit. Missionary work, of course, but it pays with the woman who has been breaking her back over a washboard.

Demonstration Procedure

Jones finds that many of these customers come back some time or other, generally with their husbands, and the machine is quite evidently the main object of their visit. He then starts out to sell the machine with all his might, and he follows a definite plan.

The first step, of course, is to arouse the prospect's interest. The general procedure may be set down as follows:

1. Machine closed, Jones remarked on beauty of appearance.
2. Advances to machine, opens, explains general features and washing principle.
3. Demonstrates wringer, contrasts with hand method.
4. Explains safety features.
5. Tells prospect about easy operation of motor.
6. Speaks of very low cost of operation.

The above are, of course, only the initial steps.

What should follow is the answer to the question "Will this machine save me anything in time and labor and will it wash my clothes clean?" That answer is where the selling punch is put into the argument, and makes all the difference whether the prospect goes away with a vague idea that she would like an electric washing machine, or buys one on the spot.

Keep the Prospect Saying "Yes"

All through the sales argument the dealer must keep in mind the psychological effect of having his prospect say "yes" throughout the period. As has been remarked by another writer "Trying to have your prospect say "yes" at the end of your talk, and all at once, can be likened to handing him a large bundle of lath and asking him to break them all at once. He can't, and you cannot make him. But you can easily have him, or her, take those laths one at a time and break them."

The process should be started by asking the prospect a few questions that cannot very well be answered except by yes. Show him or her the machine and say "That's a real compact little machine."—These little questions should be used all the way through,—not frequently enough to make your purpose apparent, but enough to keep your prospect saying yes. Here are a few instances:—"That saves a lot of work doesn't it. "The mechanism is very simple, isn't it", "That wringer is handy, isn't it?" and so on. A veteran salesman says that his method is to work the 'yes' question all through, at the same time figuring out what aspect of the electric washer question most appeals to the prospect. He then sums up his argument by discussing that question and concludes by a question calculated to receive an affirmative answer, such as—"We're putting on a fine installment plan, don't you think?

By the time the end has been reached, and the prospect has to say the 'yes' that means business, he or she is already half committed. The habit of saying 'yes' to the salesman has been formed and one more comes without a great effort.

The Cost of Washing

The greater number of machines are sold on the installment plan and the dealer can capitalize on the popularity of this practice. This is a case where figures count. If an installment plan is made a definite selling point, a certain payment system such as the payment of $10.00 per month, should be stressed. The cost of doing washing by the old method can be worked in here, and it may be shown that the machine pays for itself. One way of doing this is to draw up a table of what it costs to do the weekly washing by the ordinary method and compare it with the installment payments. Here is such a table:—

Clothes Washing Expense Hand Method

Washerwoman	$2.50
Carfare	.15
Three meals	1.20
Soap	.15
Total cost, weekly	$4.00
Total cost, one year	$208.00

Electric Method

Electric current	$0.01
Soap	.15
Total cost, weekly	$0.16
Total cost, one year	$8.32
Saving in one year	$199.68

Thus it is easily shown that the machine pays for itself in one year.

It may happen that in presenting an argument such as the foregoing, the salesman will find that his prospect objects to the fact that no figures for interest and depreciation are shown. The counter to such an objection is: You must remember that if we were to work it out to the last cent, the depreciation and interest on the hand equipment (which wears out very quickly) would also have to be taken into account. However, here are the figures, showing the items you mention.

Cost of operation	$8.32
Interest on $200.00	12.00
Depreciation (say 10%)	20.00
Total	$40.32
Gross saving	$208.00
Total expense	40.32
Net saving	$157.68

So you will see that any way you figure it, you practically pay for the machine the first year.

Pays for itself in one year

The time saved is another point that must not be overlooked. One user has estimated that an electric washer adds 19½ eight hour days to the housewife's year . This is surely a point worth telling her about.

Opportunity in the Business

The stupendous growth that has taken place in the washing machine industry since it started in 1909 is sufficient evidence of the opportunities that exist. In that year the total business in Canada and the United States amounted approximately to 225,000—in 1920 some 700,000 machines were sold, representing an expenditure of $85,000,000.

The cry of saturation is disposed of at once by a consideration of the figures—of available prospects for electric washing machines less than 10 per cent have been sold. Out of 100 women that enter your store only ten have washers—the remaining 90 are waiting to be sold.

The public is becoming educated to the fact that electric appliances are vital necessities in the home—the final clinching of the argument is left to the dealer, and the man who uses his head, grasps the situation and pushes the sale of his machines by up-to-date methods is reaping a rich harvest.

Testimonials

There is nothing more convincing than the testimony of a woman who has bought and used a machine.

A very successful dealer recently told the writer that he made a practice of getting short letters from his customers. These he would show to prospects who seemed at all doubtful of the merits of electric machines. One of his letters was worded like this:

Dear Mr. Jones:

My new machine is working perfectly and is much more satisfactory than I expected. What I notice most is that it relieves me of the hardest of the work, the drudgery of it. I actually do not dread a washing day, and as a matter of fact would rather do it than the upstairs work. I still have a woman come in, but instead of having her spend the day over the wash tub I handle that part of the work in about two hours myself, and thus leave her the whole day for cleaning and polishing the upstairs."

Yours truly
Mary S. Mason

It doesn't really matter whether the prospect knows this customer or not—the psychological effect is there—the direct evidence that the machine satisfies the needs of another woman whose circumstances are much the same as her own.

Demonstration

Seeing is believing. There can be no question that the best evidence of the value of washing machines is clean, white clothes. The average housewife doubts the ability of any machine to take the place of the wash-board. Therefore she must be "shown". The store is the easiest place to attract her attention first but the laundry in the home is the logical place to clinch the sale. The salesman must never feel that, because he has failed to sell from the store, he has lost the sale. He still has his best card to play. He must now bend his efforts towards getting the consent of his prospect to try out the machine in her own home. Once there, the odds are in favor of it never coming out. This is especially true if the dealer is careful to see that proper instruction is given. A woman demonstrator is best for this. A dealer friend tells us he employs a woman demonstrator entirely to go out to the homes. She has the housewife's viewpoint; can answer her questions and appreciate her difficulties.

While the washing is actually under way is a fine opportunity to win the house-wife over. Here she is, free to talk and rest while the washing is being done. It's what might be called "a grand and glorious feeling," and the wise saleswoman takes fullest advantage of it to ingratiate herself in the lady's good graces.

One Dealer's Experience

This is the story of an electrical store that had an income of about $125,000 last year, and is showing an increase for every month this year. On an average, one washing machine a day is sold—the manager's ultimate aim is 100 washing machines a month. A good deal of this firm's success results from the manager's policy. Here is an outline of it in his own words:—

"I believe in selling on durability and service and in taking great pains to make the customer understand thoroughly just what the machine does, how to operate it, what it costs and how it is made. Customers sometimes tell me that they enjoy trading here because everything is explained so clearly. If a customer is familiar with the construction and operation of the machine she buys, she is not likely to become dissatisfied.

Make sure the customer understands the operaton of the machine

"We make a point of demonstrating every machine right here in the shop. Then our lady demonstrator goes out to the home and sees that it is properly installed and that everything is in perfect condition. She makes sure that the customer understands the operation of the machine.

"I never let our service department slacken off. Besides answering calls, the service man drops around and looks at all our machines in the neighborhood. This sort of service pays.

"We have very little trouble with dissatisfied customers, but when a complaint does come in, I always go out to the home myself and investigate the cause of the trouble. And we always refund the customer's money if she wishes it, or give her other goods of equal value.

"There is nothing spectacular about our methods, but we are selling washing machines and other appliances while the other fellow is standing still, and the reason is that we keep our customers sold and make them our best advertisers."

"Bringing Home the Bacon"

Brief Outline of Three Actual Campaigns that Gave Excellent Financial Results—Not Difficult to Get Public's Attention

Using Radio Set for Prize in Competition

The lull in summer business set the manager of one up-to-date electrical store devising ways and means of getting more sales on his books. Washing machines had been particularly slow, and he concentrated on them.

The result of his planning was the holding of a children's contest. Advertisements were run in the local papers, offering the choice of a good radio set or a portable lamp to the boy or girl who sent in the largest number of persons to witness a washing machine demonstration. The advertisements were illustrated by cuts of the prizes and later, as the scheme progressed, the prizes were shown in the store windows.

It was deemed advisable to run the advertisements some days in advance of the opening of the contest, which extended over two weeks. One of the ads. was as follows:—

PRIZE CONTEST

Radio Set Or Portable Lamp
Free To Some Boy Or Girl

What boy or girl that is reading this is going to win this long distance radio set, or the beautiful portable lamp? It may be you—everyone has an equal chance, the winner is the one who hustles.

All you have to do is to distribute admission tickets. These tickets admit people to demonstrations of the—Electric Clothes Washer. You have nothing to sell, just give the tickets to all your relations and neighbors and have them come in and vote for you.

The demonstration of the washer will show how easy it is to do the weekly washing in a few minutes. Dirty clothes will be washed white and clean before your eyes.

COME IN AND GET YOUR TICKETS!

Interest was high, right from the start. After school, on the first day the ad. appeared, the boys and girls came down in droves. Each was registered at the store and given a quantity of tickets to distribute. It was explained to them that to get credit for the tickets, each one had to be handed in to a salesman by a person who came in to witness a demonstration.

The actual demonstration was very carefully gotten up. An experienced lady demonstrator was used, and the whole was arranged in the manner of a pantomine. Toward the last of the two-week period the names of the leading contestants were printed in the daily paper, together with the standing of each.

Names of prospects were secured in large numbers and the personal canvass which followed resulted in the sale of a number of washers. Results from the publicity are still coming in.

Co-operative Newspaper Advertising

There is one prominent town in Ontario where the business is pretty well distributed among four dealers. These four are progressive, believe in fair competition, and are willing to co-operate.

It occurred to one of them that there were not enough washing machines out in their territory. He broached the matter to his brother dealers and as a result they got together and used a liberal space, which dealt with washers only, in the local newspaper. The following head was used for the advertisement:—

AVOID WASH DAY DRUDGERY
—DO IT ELECTRICALLY—

The following firms are in a position to furnish you a good washing machine to do the work.

Zinc cuts were obtained that showed the old and new methods of washing; these were worked in underneath the heading. The "Old Way" cut showed a woman bending over a steaming tub of suds and bearing an extremely tired and worried look on her face. The other showed an electric washing machine doing the work while a woman was seated at ease in a rocking chair reading a book. All the names were signed below, giving the same prominence to each.

The page was run weekly and enquiries and sales soon began to come in. These dealers claim that by grouping their advertisements a much greater effect was obtained. The average reader was impressed by the fact that a whole page was given to washing machines, much more than if the same number of small advertisements had been scattered through the paper. The result has been that washing machines are being placed in greater numbers than ever before, each dealer, of course, following up his advertisement with intensive selling on his own account.

Featured an Installment Plan

The wide awake manager of one large western store found himself up against a power shortage that cut down the sale of ranges, heaters and other large current consuming devices. To keep up his sales totals was the problem, and he solved it by concentrating on washing machines.

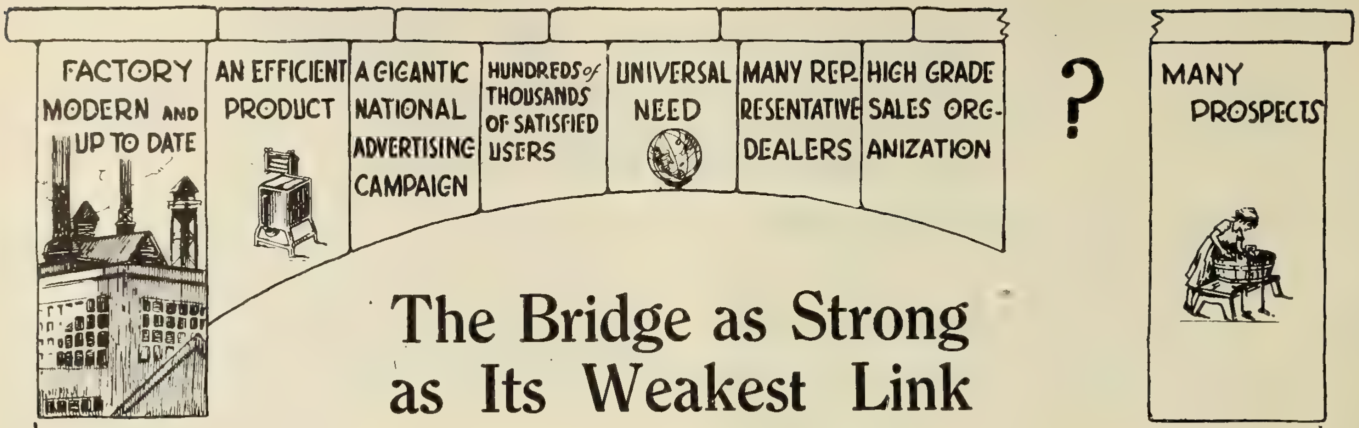
He looked over the washer market, and selected one type of machine which he found had sold very well in his neighborhood. A consultation with his supply house resulted in their co-operation, and he was able to count on their assistance all through the campaign.

A popular priced installment plan was then worked out. He was able to offer a price of $98.00 on this machine, and sell it on a $10.00 cash payment with the balance in twelve monthly installments.

These were the features of the campaign:—

(1) Plenty of snappy advertising.
(2) Popular prices.
(3) Easy terms.
(4) Intensive selling.

The result of the campaign was the sale of three hundred washers in one month. The installment plan outlined above proved a great drawing card, and a surprising number of washers was placed in homes where it is generally considered difficult to sell a machine.


FACTORY MODERN AND UP TO DATE
AN EFFICIENT PRODUCT
A GIGANTIC NATIONAL ADVERTISING CAMPAIGN
HUNDREDS of THOUSANDS OF SATISFIED USERS
UNIVERSAL NEED
MANY REPRESENTATIVE DEALERS
HIGH GRADE SALES ORGANIZATION
?
MANY PROSPECTS

The Bridge as Strong as Its Weakest Link

Home Demonstrations an Essential Factor in Bridging the Chasm Between Factory and Home

What is the situation in the washing machine field today?

We find that there are plenty of manufacturers in the field.

They have reduced washing machine manufacture to a science. The production end of the game is pretty nearly 100 per cent perfect.

How about the machines they produce? The machines do the work they are claimed to do. They save time and effort. They are well built. There are thousands of satisfied users of electric washing machines. These are a testimonial to the efficiency of the product. But there are tens of thousands waiting to be sold.

Why are only 10 per cent of the people who live in wired homes equipped with electric washing machines?

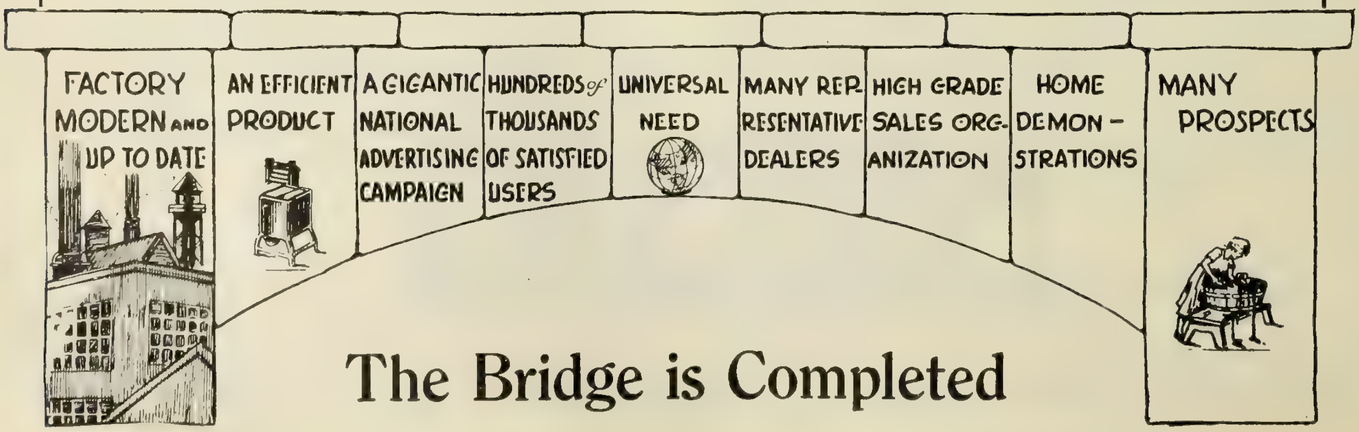
The answer is given in the illustrations. Look at the top one. The last link between the sales force and the prospect is missing. There is something further needed to connect the lady at the old-fashioned wash-tub with the high grade sales' organization. She has seen the advertising and the exhibitions but she is a little bit skeptical It is a lot of money for her to spend. And then it might not do the work. That would be awful.

What she needs is to be shown. Look at the bottom drawing. The bridge is complete. Somebody gave her a home demonstration. The lady at the wash-tub is connected with the high grade sales' organization. She may be a timid woman or a very busy one. The salesman is going to do her washing for her in her own home. She is going to get a chance to examine the machine and appraise it without the restraint she feels is public.

She is a live prospect, but hitherto she has been neglected. The sales man is going to sell her.

The situation in the washing machine field is O.K. The scientific manufacture, efficient product and material advertising are not wasted. The home demonstration has come in, in its proper place.

The bridge is completed!


FACTORY MODERN AND UP TO DATE
AN EFFICIENT PRODUCT
A GIGANTIC NATIONAL ADVERTISING CAMPAIGN
HUNDREDS of THOUSANDS OF SATISFIED USERS
UNIVERSAL NEED
MANY REPRESENTATIVE DEALERS
HIGH GRADE SALES ORGANIZATION
HOME DEMONSTRATIONS
MANY PROSPECTS

The Bridge is Completed

The Contractor's Second Best Method of Estimating Wiring Costs

By **J. W. COLLINS, E.E.**
Secretary Chicago Electrical Contractors' Association

When a paper is written on a subject it is usually intended to convey the writer's idea of the best for the subject. I am disregarding this theory and will state that I am going to discuss what I call the second best on the subject.

The best method of estimating wiring costs is by the unit of material and labor cost system. This system should apply to every wiring job. You know that as well as I do. We also know, however, that the contractors will not use it on certain classes of work, namely, home and apartment wiring. On this class of construction they insist on estimating on the outlet count basis, which is about as correct as establishing the price of a coat by a button count.

Counting outlets as the sole basis of estimate not only affects the construction of the job, but is one of the greatest hindrances to the progress of the use of electricity in the home. This can best be proven by an analysis of a home wiring job.

I claim there are four distinct items of construction in home wiring that can be scheduled and made uniform in price to the extent that they are so constant in cost that there is very little variance from the unit of labor and material method. These units may be designated as Service—Meters—Circuits and Outlets. We will take them up in the order named.

Service.—In each locality a definite system of servicing a building is established by an inspection body or central station. Rules of service are usually such as define exact locations for service entrance and service switch for each type of building. Such being the case we may properly estimate a service cost for each type of building and sizes of service from the smallest allowable to the largest anticipated for each type.

Meters.—The same influence governs the arrangement of meters and therefore a proper constant cost may be arrived at.

Circuits.—The run from cutouts to first outlet on each floor are invariably of the same construction and quantity of material, so we may estimate circuits from one to maximum for each floor and arrive at a very accurate uniform cost.

Outlets.—You will admit we have covered considerable ground and expended some time and material up to this point, which is not considered in the flat outlet estimating system at all. Now we will figure outlets for just what they are, simple loops of material from one to the other and can be properly averaged in cost.

Let us apply the outlet counting system of estimating to two jobs of the same type in comparison with the four unit system as to cost finding and the effect of each system as to its influence on increasing the further use of electrical home appliances.

A two-storey residence wired in rigid conduit having a specification as follows: Eight ceiling outlets for thirteen lights, two brackets for two lights, one wall outlet for one light and two wall switches. We have a total of sixteen lights.

Estimating this job by Chicago conditions we find the service extends from second floor ceiling joist to three feet or less within the basement. Our schedule for the given number of lights and type of buildings would show a 25-foot service of two fourteen wires in one-half inch conduit. Next comes our meter-loops and meter-board which are standard in design and material, and, therefore, a scheduled cost per meter would apply. Now we come to the circuits and that portion of the cutout box applying to each circuit. Circuits run from the cutout box to first outlet on each floor and are so uniform in construction that we may properly cost this portion of the job by schedule.

We have traveled some distance to this point and we haven't touched on what most contractors constitute as being the only consideration in a job.

Outlets are simple loops from one to the other and should only be considered as a unit of the estimate. We can strike a very fair average of material and labor for all classes of outlets and fall little short of a perfect estimate.

Getting back to the job under consideration we will establish a cost schedule, the figures being accurate only for comparison, and attempt to show the merit of the four-unit estimate.

Cost Schedule

2 storey No. 14—2 wire service	$ 7.50
Meter loop (Conduit and Appleton fitting)	2.50
1-2 storey circuit (loop out for first floor)	6.50
Ceiling outlets	2.50
Bracket outlets	2.25
Single pole switch	3.00
Base receptacle	3.30

Our job as it stands estimates as follows:

Service	$ 7.50
Meter	2.50
Circuit	6.50
8 Ceiling outlets	16.40
2 Bracket outlets	4.50
1 Base receptacle	3.30
2 single pole switches	6.00
Total cost	$46.70

We must admit our house is not properly wired under this specification and we will now estimate a complete or at least a more elaborate installation by the four-unit method and by the outlet count method.

Let us add 6 ceiling outlets, 2 brackets, 3 base receptacles, and 3 switches, not an unusual sale.

Using our four-unit method we find no increase in service cost, no increase in meter cost and but a slight circuit increase, our estimate now stands as follows:

Service	$ 7.50
Meter	2.50
Twin-circuit	8.50
14 Ceiling outlets	28.70
4 Brackets	9.00
4 Base receptacles	13.20
5 S. P. switches	15.00
Total cost	$84.40

Now the outlet count system assuming the contractor correctly guessed the cost of our first specification, we would have a cost of $3.59 per outlet. Adding our additional specification we find the job cost as $96.93.

In this case you will say, "very good for the contractor and not so good for the customer." We have overcharged the customer ninety cents plus our overhead and profit and undoubtedly lose the sale of several of the outlets, which means the manufacturer, jobber, central station and fixture industry all lose with him.

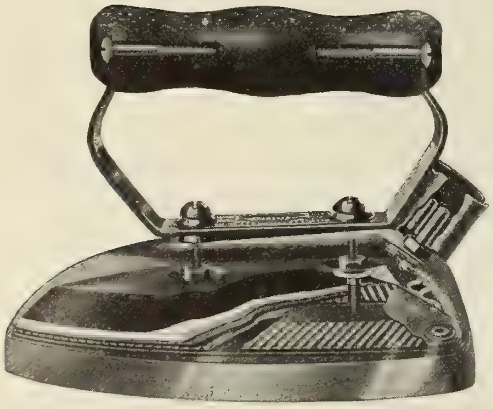
Suppose we reverse the schedules and assume the outlet counting contractor based his outlet figures on the second specification and was called to estimate the first specification.

We find our cost per outlet in the second specification is $3.12 per outlet, our first specification being 13 outlets we find a cost of $40.56. If our four-unit system is correct the contractor has made an unconscious contribution of $6.14, for which he receives no honorary mention. Our jobbers may come to the conclusion that we are getting an abundance of the first specification jobs, from the appearance of our accounts on their books.

It is not fair to guess on an estimate when so little time and effort is necessary to get a proper estimate. I know the four-unit system will prove its value, because I have had personal contact with a firm that has depended entirely on the system to estimate as high as fifteen hundred jobs completed per year and the variance from job to job was so slight in comparison with actual completed costs that it would seem impossible to arrive at a system more accurate.

The Development of Electric Ironing

About the year 1890 inventors began working on the problem of developing electrically heated appliances of various kinds. Flat or sad irons then in use were the same as had been in use for hundreds of years. The natural thing was to take one of these old irons, cut a hole in it, insert an electrical resistance coil and attach an electrical wire of some sort to this coil to make the connection with the lamp socket. One of the first electric irons made was fashioned along these lines. It weighed six pounds and consumed about 400 watts. Gradually improvements were made over the older types. A wooden handle was used instead of a metal one making it unnecessary to use a cloth protector for the hand. While the heater cord was still permanently attached to the iron, a spring was added to protect it and keep it from becoming kinked at the point of support so as to avoid quick breakage due to the wear of service. Another big step forward and one looking toward increasing the beauty and attractiveness of the flat iron was nickel-plating the spring, the handle strap, the top casting and the middle casting. The bottom casting was not originally nickel-plated but was simply polished and then treated with a hot solution of beeswax to make it brown and prevent quick rusting.



The electric iron of to-day has progressed far from those first crude specimens. The cord has now become detachable, connection being made by means of a plug which can be removed from the iron at any time. The shell or cover of the electric iron is now usually pressed steel and it is very highly nickel-plated to give an attractive appearance to the iron. Heating elements have also been improved and their position in the iron body has been designed to give the greatest heat at the point where it is most needed. Also the electric iron of to-day can easily be taken apart by the electrical contractor-dealer for making repairs.—Northern Electric Bulletin.

Features of a Campaign that Placed 600 Washers

Two Years of Plugging but then Results Came In

A certain electrical merchandising concern has recently sold over 600 electric washers—this in a city of 35,000.

The manager of this store states that it took a long time to produce results, but when they did start to come in, they exceeded expectations.

The washing machine campaign included a house to house canvass that was carried out until every possible prospect had been seen. The canvasser was considered to be a pioneer, doing the spade work for future sales. A big percentage of the population were factory workers, and the outlay of $150.00 or so was a big matter to them, even on an easy payment plan. It had to be discussed pro and con, months perhaps being required to arrive at a decision.

After this initial canvass, the work was by no means allowed to drop. A complete card index was made, and the more promising prospects segregated. The cards were segregated into five files; the main file, indexed alphabetically; the follow-up file, indexed according to date; the "sold" file (for future service calls or to interest in other electric appliances); the "sold to competitors" file; and the "not interested" file (usually three calls to determine placement therein). The cards, were so arranged that a lot of miscellaneous information about the state of mind of the prospect could be written down, which was of great use for future reference and particularly when making the next call. The date of call or communication by telephone was always written down in one column and at the conclusion of the call the date for the follow-up call was written in the column for the purpose and then the card put in the follow-up file under the follow-up date noted. Thus the salesman was able to plan his work to the best advantage.

No effort was spared to produce results. Suggestions to husband or grown-up children when the housewife's birthday was near, or at Christmas time, often produced results. Home demonstrations were featured and machines were left in the houses wherever possible.

A very generous installment plan was part of the programme. Just before the Christmas holiday season, several advertisements were run announcing that a washer could be secured for an initial payment of $5. with no further payment till the next February. This proved a great puller.

The results of all this steady work was that an unprecedented number of machines were sold and the idea of steady plugging has taken root in the sales force, with good results still coming.

Set a Mark To Shoot At!

Does Your Sales Quota Yield a Profit After Expense is Deducted?—Set a Definite Total and Work to that End—Cutting Down Expenses—Means of Increasing Net Profits

By A. M. BURROUGHES

To operate a business successfully, it is necessary that you have some definite standards by which to measure results accomplished. You must have a mark to shoot at.

After an analysis of your territory and its prospects you may find, for example, that you con reasonably anticipate an annual sales volume of $36,000.00. Then divide it like this:

$36,000.00	Annually
3,000.00	Monthly
693.00	Weekly
116.00	Daily (six-day week)

Your daily sales quota is $116.00, but right now is the time to see if that will yield an adequate profit after your daily expense has been deducted.

Make a chart of the daily expense that is involved when you open your doors every morning. The business month will consist of twenty-six days, and each week of six days in applying rent, light. heat, etc. The figures given below, are used simply as an illustration of the principle only. In practice these accounts must be carefully based on actual conditions.

Rent	$5.75
Light, Heat and Power	2.00
Postage, Telf. and Telg.	1.00
Interest paid and Cash Discount given	1.00
Salaries	9.00
Taxes and Ins.	2.00
Shop Exp.	3.25
Advertising	2.50
Depreciation	1.20
General exp.	.50
	$28.20

In these expenses a salary is included for the proprietor. This is a part of the expense. You should draw your salary as any other employee of the business. It must be included in the salary amount if you are to have a true basis for figuring profit.

Cash discount given is rent paid for money just as truly as interest, so that item is included in the expenses.

Depreciation is actually figured annually. It should, however, be estimated and charged monthly. At the end of the year an adjustment can be made.

From our daily chart we find that our anticipated sales are $116.00 daily, and our fixed expense at least $28.20 daily.

$116.00
28.20

$ 87.80

This leaves $87.80 for the cost of goods sold. For purposes of illustration, we will say that you mark-up your merchandise 30% on sales (and all mark-up should be figured on selling price). Perhaps your mark-up is larger or smaller. Conditions vary in different localities. Using 30%, then your gross profit will be:

30% of $116.00	$34.80
Expense	28.20
Net Profit	6.60
% Net Profit	.057

This is not an adequate return for the time, effort and capital invested. It would give you only about $2,000.00 net return on annual sales of $36,000.00 To increase net profit you must do one or more of three things—

1. Increase selling prices.
2. Increase sales volume.
3. Decrease expenses.

Competition and established sales policies have fixed the selling prices and for this reason you cannot increase the mark-up.

But the last two factors are within your control. You can possibly increase your net profit by both increasing sales and lessening expense. Better service, a more intelligent cultivation of territory and greater sales effort will increase the sales volume. You can add at least $9.00 per day to your sales by these means.

By careful use of light and by adopting other economies. you should save 25 cents per day. You can probably save 25 cents a day in the store by eliminating wastes and lost time. Possibly a salary saving of 50 cents per day may be made in the salary account.

On this basis re-figure the daily quota of Sales and Expenses and Profits.

Sales

$39,000.00	Annually
3,250.00	Monthly
750.00	Weekly
125.00	Daily

Expenses

Rent	$5.75
Light, Heat and Power	1.75
Postage, Telf. and Telg.	1.00
Interest paid and Cash Discount given	1.00
Salaries	8.50
Taxes and Insurance	2.00
Shop Expense	3.00
Advertising	2.50
Depreciation	1.25
General Expense	.50
	$27.20

Profit

30% of $125.00	$37.50
Expense	27.20
Net Profit	$10.30
% of Net Profit	.0824

Net Profit on $39,000.00 Annual Sales $3,213.60.

If 30% is your Gross Profit and your fixed daily expense is $27.20 then you must sell each day $90.70 worth of goods before you have made a cent of profit.

For 30% of $90.70=$27.20 Daily Expense.

Then 30% of every additional dollar sold is Net Profit.

Set up this daily quota. Keep a record of it. Compare your actual sales with your quota daily. Quota should be your minimum performance. When you fail to make wour daily quota, add the deficit to the following day.

"New Factory at Niagara Falls"

Construction of a factory for the Dominion Insulator and Manufacturing Co., Ltd., a division of the Ohio Brass Company, was recently started at Niagara Falls. The new plant will produce high tension porcelain insulators, and electric railway equipment, such as trolley material, rail bonds and car equipment.

It is stated the factory will be of most modern construction and that the layout of machinery and buildings is arranged for the most advanced processes. Production will be started sometime before January 1, 1923.

Activities of Manitoba Electrical Association

At the fortnightly luncheon of the Manitoba Electrical Assn., held at the Fort Garry hotel on Thursday Oct. 5th, the speaker of the day was H. J. Vennes, Transmission Engineer, Northern Electric Co. His subject was "Radio Transmission." Mr. Vennes said that if radio broadcasting is going to continue to be of popular interest, it must be carried on, on a very high level, that is to say, the transmitting equipment must be capable of transmitting either voice or music with practically no distortion, and the entertainment must be provided by very high class artists, otherwise it will not be of sufficient interest to attract the interest of the general public. Furhermore there must be government regulations as to wave length allocation, so as to prevent the interference of the various broadcasting stations. There will also be required some regulations in regard to receiving sets. Unless due consideration is given to all these points, it is quite evident that radio broadcasting will not grow in popularity.

Mr. Vennes also conducted a radio demonstration with a receiving set which was installed in the dining room of the Fort Garry in connection with a 10A Northern Electric loud speaker. This was the first demonstration made with this equipment in Western Canada. Broadcasting was done from the radio-telephone station which has recently been installed at the Sherbrook Exchange by the Manitoba Telephone System. The programme included a short talk by Mr. H. E. Brockwell, chief engineer of the Manitoba Telephone System, outlining the use which is to be made of this equipment; it sounded as clear as though he were standing in the room.

He said that it is the intention of the Manitoba Telephone System to use this equipment as a part of a radio-telephone link to operate between Swan River and The Pas The present equipment will constitute part of the installation for one terminal of the radio link and when the remaining equipment is provided it will furnish telephone service between The Pas and Swan River. This equipment will be so associated with the telephone lines at Swan River and The Pas that a telephone subscriber at The Pas can talk to any telephone subscriber in Swan River or any other point in the Province. The transmitting unit in this equipment will have two 250 watt vacuum tubes in the oscillating circuit, and, two similar tubes in the modulating circuit. It is considered this equipment will have a daylight range of 150 miles, although good atmospheric conditions and especially at night the range may be ten times or more greater.

With commercial telephone equipment available at the present time, it is not possible to make telephone transmission reliable over a distance greater than about 200 miles, as since for toll service it is absolutely necessary that the transmission should be of a commercial grade at all times, and therefore the equipment must be designed with the idea of giving satisfactory transmission under the worst conditions.

A large amount of development work is being done at the present time on vacuum tubes of much greater capacity than those used in the past. The Western Electric Co., have actually made power vacuum tubes with an output capacity of 10 and 100 kw., and as soon as the associated equipment is provided for using these tubes in a radio phone transmitting outfit, it will be possible to talk over a much greater distance than can be done at the present time, it is not at all inconceivable that Transatlantic Radio Telephony will be established before very long. A vote of thanks was tendered Mr. Vennes.

Miscellaneous Notes

The Manitoba Power Commission is preparing for a busy season next year. They expect to build a large mileage of high tension line, and start on a very comprehensive network of rural lines throughout the Province of Manitoba.

George L. Guy, has been engaged by the City of Fort William to investigate and report on the construction, operation, and management of the municipal Electric Railway System. It has been showing a loss for a number of years, and it is hoped by reorganization and improved operating methods, to be able to better its standing. The investigation is to start on the morning of October the 1st, and the report will be available about three weeks later.

The Canadian General Electric Co. Ltd., having recently absorbed the Canadian Edison Appliance Co., Mr. J. E. Brickenden, recently western representative of the latter firm has joined the staff of the Canadian General Electric Co., Winnipeg. He will continue to look after the Hotpoint lines in Manitoba, Saskatchewan, and Alberta. He will handle the jobbing end as in the past. including the C.G.E. branches.

Mr. Cleveland, consulting engineer, was a recent visitor to Winnipeg where he investigated the operations of the Winnipeg Hydro-electric System.

So many accidents happened after the severe storm that visted Winnipeg this year, when there were many fallen wires, it was deemed necessary to use safety first propaganda. The accompanying cartoon was part of it.

A Brief Discussion of the Vacuum Tube as Adapted to Wireless Telephony

Application First Made in Wired Telephony—The Wehnelt Cathode—Curves Obtained With Peanut Tube

By W. B. CARTMEL, B.S., M.A.*

The lecture that I am going to give you this afternoon covers the transmission of speech and music by radio. What I have in mind is a discussion of the finer points of receiving and transmitting equipment which are necessary in order to satisfactorily transmit speech or music. Such transmission has only been rendered possible by the development of the vacuum tube, so that my paper will include a very brief discussion of these tubes and especially of the peanut tube in which I believe you are all extremely interested. I do not intend to say much about vacuum tubes in general because amateurs are quite familiar with such tubes, in fact it was stated recently in one of the papers that there are over four thousand vacuum tube sets in use in Toronto. As you are all aware, the audion bulb has resulted from a discovery made by Edison in the year 1883. He placed a metal plate within an incandescent lamp bulb in which the filament was lit up by a D.C. voltage of something like one hundred volts. On connecting this plate with the positive terminal of the filament, he was able to obtain a current of several milliamperes. The arrangement is shown in Figure 1.

Discovery of Electron

This was never properly understood until the discovery of the electron in 1897 by Sir. J. J. Thomson. It was found that in the exhausted glass bulb particles of electricity were shot off from the filament across the vacuous space in the lamp to the metal plate and these particles then flowed around through the connecting wire of the milliammeter back to the positive terminal of the filament. It is not my present purpose to enter into a long discussion about electrons, but I do wish to say that in 1897 Sir J. J. Thomson did definitely prove that electricity consists of very minute particles.

Adaptation of Vacuum Tube

The adaptation of the electron tube for amplifying speech was begun ten or fifteen years ago by the engineers of the Western Electric Company and of the American Telephone & Telegraph Co. in the U. S. Many of these repeaters are through line repeaters and current is flowing through their filaments twenty-four hours a day, every day in the year. For this reason it was found important to have a minimum consumption of electric power in the filament. You will readily see the importance of economy in this case; while others were developing a tungsten filament for vacuum tubes, telephone engineers were working on a type of filament more difficult to produce but having the advantage that it consumes less power. This filament was originally a European development and is known as the Wehnelt cathode. The Western Electric engineers, starting with the idea of the Wehnelt filament, which is a filament coated with certain chemicals making it give out electrons at a lower temperature than would be required by a tungsten filament, finally succeeded in developing a filament consisting of a platinum-iridium wire coated with barium and strentium exides which gives off electrons copiously. It only requires to be heated to a dull red heat as compared with the white hot tungsten filament. In this way they succeeded in producing a vacuum tube which gave splendid results with only a very small consumption of electric power. I have here a picture of this tube (Figure 2). It was used for amplifying currents in a telephone line.

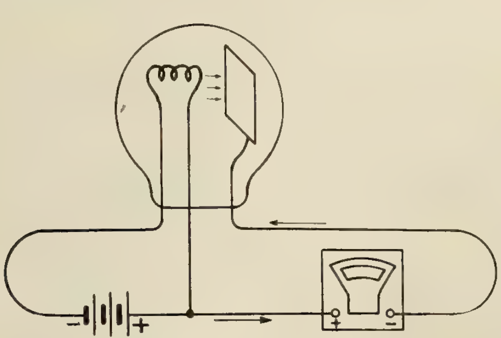


Fig. 1—Discovery of Edison Effect

Developments of the VT-I

I wish next to speak of the development of a little tube used as a detector or an amplifier designed for use by the United States Signal Corps, and shown as the VT-I (see Fig. 3). These were produced by hundreds of thousands during the war. The filament of this tube was made of the Western Electric standard filament material, previously mentioned as having been developed for repeater bulbs, and in this tube good results were obtained using only 1.1 amperes and 2.5 volts for heating the filament. This made a record for economy of power consumption and led to further efforts in this direction, resulting in the development of the peanut tube (Fig. 3) which will give excellent results with only one volt and .25 ampere in the filament. This you see will run very well from one dry cell.

I now wish to show you some curves obtained with the peanut tube, (Fig. 5). These curves show the value of plate current that is obtained with different currents flowing through the filament. There is also a dotted line showing how the grain increases with the filament current What is referred to here as gain frequently called amplification. On this curve the gain obtained is in the neighborhood of 24 miles of standard cable, which is the telephone engineers way of measuring amplification. This means an amplification of one hundred and eighty seven times. The method of measuring gain in miles of standard cable arose in connection with telephone repeater bulbs. On telephone lines there is a limit to the distance over which one may talk satisfactorily. Talking through a telephone over the best open wire lines this limit is about eight hundred miles, unless a repeator or some other means is used for increasing this distance. On talking over a telephone cable however, the telephone current is cut down much more strongly and satisfactory transmission from an ordinary telephone set can not be obtained over a greater length than thirty miles of standard No. 19 gauge, paper insulated, telephone cable.

Measuring Gain From a Vacuum Tube

In our laboratories we make up an artificial cable box containing a suitable combination of resistance coils and condensers which is used for various purposes, and among other things for measuring the gain from a vacuum tube. In measuring the gain by means of this artificial cable, we find how many miles of cable may be added in the circuit when a vacuum tube is inserted, and still get the same volume of sound in the receiver. This gives us the gain in miles of standard cable. You will note that as the current through the filament is increased from .25 of an ampere up to .3 of an ampere the gain increases by only about one tenth of a mile out of a total of twenty-four miles, and there is therefore very little advantage in using higher current values.

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*Before Wireless Assocation of Ontario.

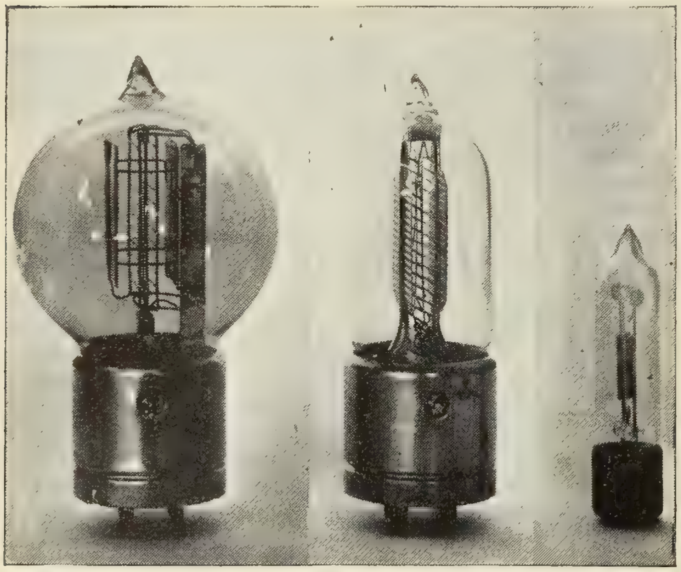


Fig. 2 Repeater Bulb

Fig. 3 VT-I Detector

Fig. 4 Peanut Tube

From the standpoint of life, variations in the current through the filament make an enormous difference. In order to obtain the best results with longest life with this filament, it is desirable to check the filament current with a suitable ammeter. This is different from the case of the tungsten filament which is run at constant voltage in order to get the best results. The other conditions that we reccommend are that the plate current should not exceed .6 of a milliampere. These are the points to be borne in mind if you wish to obtain a very long life from your tubes. Keep the plate current down to .6 of a milliampere and the filament current as low as possible. Now, as regards the battery voltage, the plate battery should not be run at over 50 volts with the grid connected direct to the negative end of the filament, although 40 volts is more generally used. If we have a negative potential—a so-called bias potential—on the grid, we may add five or six volts in the plate battery for each volt added. Thus with a negative voltage of 1-½ volts on the grid we may add nine volts more to the plate battery making a voltage on the plate of forty-nine volts or with the grid 4-½ volts negative we recommend a maximum voltage in the plate battery of 67-½ volts.

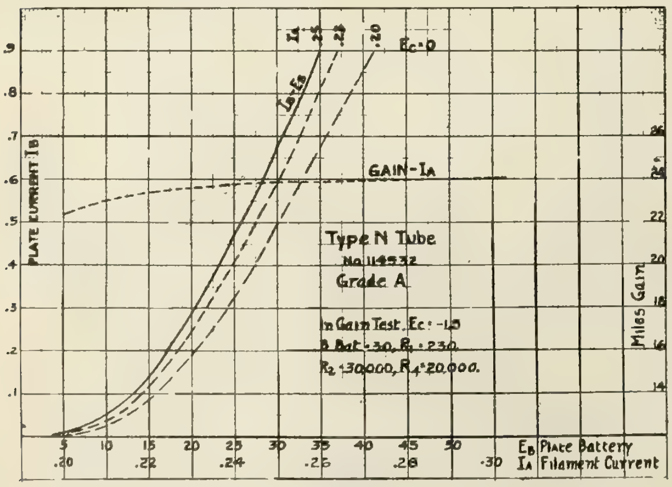


Fig. 5—Curves obtained with peanut tube

Power Required to Produce Electron Emission

Now, while I have emphasized the conditions under which you obtain the longest life out of your tube, I do not wish you to think that these tubes are liable to burn out in a short time or that they are inferior as regards length of life to tubes having tungsten filaments. The emission of electrons from tungsten filaments is so poor that they have to be heated white hot in order to give a satisfactory emission of electrons. I have here a curve (Fig. 6) showing the difference as regards power required to produce the same amount of electron emission from the tungsten filament as from standard exide coated filament. It will be noted from this curve that using standard coated filament it is possible to construct an efficient tube having an average life of 5,000 hours. A tube known as the VT-I has an average life of 5,000 hours. This length of life is not guaranteed for every tube, although since it is an average value many of the tubes exceed this length of life.

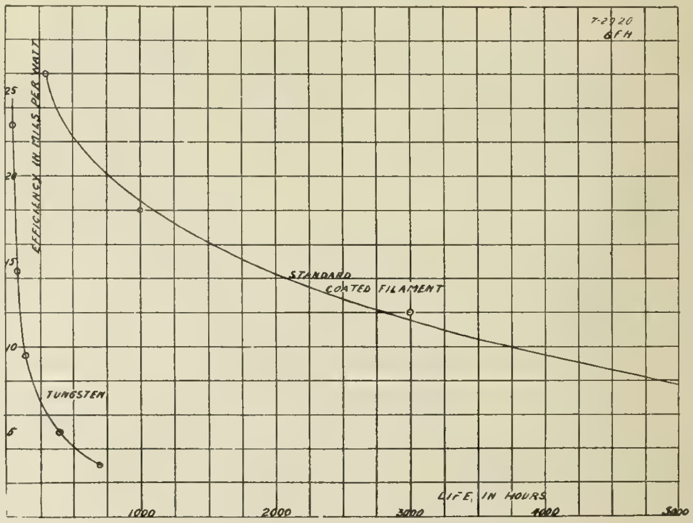


Fig. 6 Comparison of power required

Toronto Branch Will Not Broadcast

Toronto members of the Wireless Association of Ontario will not take advantage of the recent change in government regulations which restrict the privilege of obtaining special amateur broadcasting licenses solely to amateurs' associations. "So long as I have any say in the matter, we will not take out a broadcasting license," said Pres. Keith Russell. He gave several reasons, principal among which were the heavy cost that would be entailed in maintaining a station, the necessity of having regular club rooms, and the fact that there promises to be no shortage of broadcasting to listen in to during the coming winter. The change in regulations, he pointed out, was made with the special view of enabling fans in districts where there was no broadcasting to remedy this lack. New regulations also provide that in case an association does not desire to operate a station of its own, it may relegate this privilege to any one member or group of members.

Material Required For a Simple Crystal Set*

Dealers Can Avoid Bad Assortments of Parts by Selling Complete Sets of Material For Building

Over 60 per cent. of all radio sets are built by their owners. It's cold logic you can't afford to pass up this market. Yet a good many merchants are attempting to gain it by a round-about, and frequently unprofitable way. Their method usually consists in stocking a large assortment of different makes of parts, many good in themselves but having no relation to each other. The result is uncertainty in turnover and profits.

Every radio dealer has had the experience of selling radio sets piecemeal; the customer (usually a boy) comes in time after time for trumpery bits of apparatus and the business, if not unprofitable, is troublesome.

One way of getting over this difficulty is to advertise and sell a complete set of parts for making up a complete set. By adopting this method of procedure the customer gets what he wants in one purchase and saves the dealer a great deal of time. Then again, a well advertised set of parts is a great drawing card for this class of trade.

This present article deals with only the simplest and cheapest construction. Such a set is a starter, however, and pays the dealer if he can sell it without too great an overhead. It should be understood that ten miles is about the range of such a set.

Only Few Parts Required

Here are the items to sell your customer:—

1 fibre tube, about 4 in. outside diameter, wall 1/16 in. or 1/8 in. thick, 6 in. long.

½ lb. spool No. 22 or 24 cotton covered wire.

10 contact points.

4 binding posts.

1 switch arm, knob and bushing, complete.

1 crystal detector.

1 small fixed condenser.

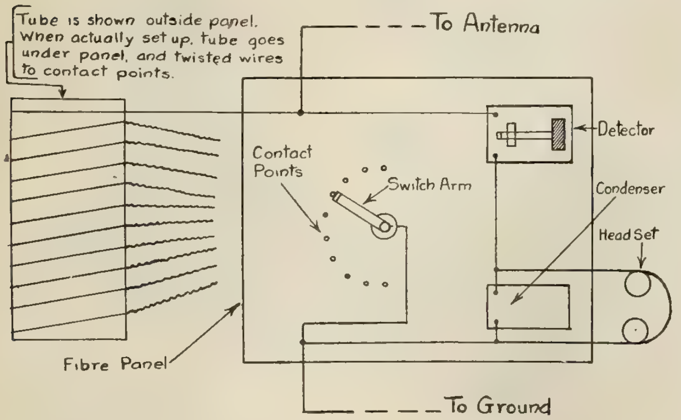
1 head set.

1 fibre panel, about 7½ in. by 1/8 in. or 3/16 in.

An antenna is not essential if very close to a good broadcasting station. Telephone wires, clothes lines, bed springs and so on have been used with success under such circumstances. It must be understood that this will not do for any considerable range.

How to Put the Set Together

With the above apparatus it is no great trick to put a set together. You can instruct your customer as follows:—



Tube is shown outside panel. When actually set up, tube goes under panel, and twisted wires to contact points.
To Antenna
Detector
Contact Points
Switch Arm
Condenser
Head Set
Fibre Panel
To Ground

Putting the set together

Wind the tube with 110 turns of wire, tapping every tenth turn, that is, bare it and twist it as shown in the drawing. Now arrange the contact points on a fibre panel. in a semi-circle so that they will be covered by the switch arm which is also placed on the panel.

The next step is to connect up the various pieces of apparatus. Connect the coil taps to the contact points. Arrange the detector and condenser on the panel as shown in the drawing and fix the binding posts for antenna and ground.

A window display of the complete parts, with a card giving the individual items, is a good way of advertising the set. Another stunt is to mount all the parts on a large panel, with a showcard. Again, a set is nicely made up of the materials, and given a prominent window position. However, such outfits are not hard to sell, the main thing is to give the fan a clear idea of what he needs.

Many Radio Licenses Issued

The Department of Marine and Fisheries has announced that the facilities for obtaining radio receiving licenses have been extended whereby this class of license will, in addition to the post offices already announced, be obtainable at the following post offices,—

South Vancouver, B. C.; New Westminister, B. C.; Brandon, Man.; Fort William. Ont.; Port Arthur, Ont.; Sault Ste Marie, Ont.; Peterboro, Ont.; St. Catharines, Ont.; Niagara Falls City, Ont.; Kitchener, Ont.; Sarnia, Ont.; Galt, Ont.; Chatham, Ont.; Stratford, Ont.; Guelph, Ont.; St. Thomas, Ont.; Kingston, Ont.; Lachine, Que.; Westmount, Que.; Three Rivers, Que.; Sherbrooke, Que.; Verdun, Que.; Glace Bay, N. S.; Moncton, N. B.

An official list of the radio stations in the Dominion is being prepared by the Department of Marine & Fisheries and will be ready for issue at an early date. The list is being made up in an attractive form and will cost approximately 75 cents per copy, including supplements, the latter will be issued every two or three months to keep the main list up to date. Any person desiring to obtain a copy of the new list should apply to the Director, Government Radio Service, Department of Marine & Fisheries, Ottawa, to have their names placed on the mailing list.

Toronto leads the Dominion for the number of Radio Receiving Licenses issued during the month of July, 110 having been issued by the postmaster of that city, Vancouver comes second with 103, and Windsor again well up with 90. The total number of receiving licenses issued during the current fiscal year to the end of July is 3,270.

Radio enthusiasts are again reminded that is is necessary for all persons operating radio equipments to have a license, the charge for a receiving license being $1.00 per annum.

Canadian Westinghouse in Radio Field

The Canadian Westinghouse Company are putting on the market a regenerative radio receiving set. To make this equipment, a special radio department has been started at their Hamilton plant. The Westinghouse vacuum tube sets will employ the regenerative current principle covered by the Armstrong patent.

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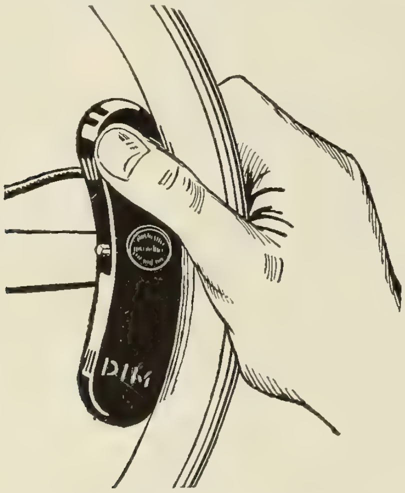
*From information supplied by S. W. Place, Radio Engineer, Diamond State Fibre Co.

The Latest Developments in Electrical Equipment

The National Electric Heating Company are manufacturing a Radiophone set; two thousand and three thousand ohm capacity. This set is very finely constructed, mechanically, and carefully tested and wrapped before shipment, and is in marked contrast to some of the headsets seen on the market during the past few months. The National Radiophone set is shown in the accompanying illustration.

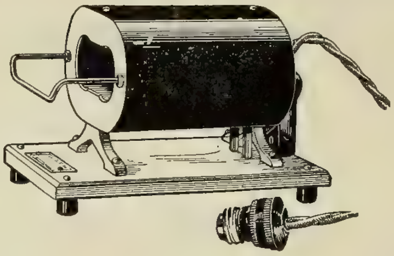
"Roxwitch" Headlight Control

A device for controlling the headlights and horns of automobiles has been placed on the market by the Patton-MacGuyer Company, Providence, R. I. When installed, the device is located on the inside of the steering wheel and is operated by a rocking motion. When bright lights are required it is pressed down, and when dim are needed it is rocked back in the opposite direction. In mid-position the lights are off. The horn button which is located in the centre of the device is operative at all times. As all parts are enclosed, it is claimed that no dust or rain can interrupt the operation of the switch.



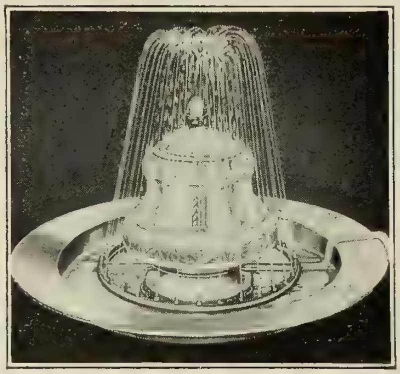
Furnace for Heating Irons

The device shown in the illustration has been placed on the market by the Op-al Electric and Manufacturing Company, Thirty-sixth Street and Kenwood Ave., Indianapolis, Ind. It is claimed by the manufacturers that it will heat two four pound irons in from ten to fifteen minutes. It is also used for heating right-angle soldering irons, tempering or annealing small tools and parts, heating small brands, welding babbitt and solder, etc. The furnace is claimed to operate satisfactorily on voltage fluctuations of five per cent; current consumption is about 500 watts. The inside dimensions are 3 by 1½ by 4½ inches; overall dimensions 8 by 5 by 5 inches, weight 4½ lbs. The manufacturers have also placed on the market a curling iron heater, designed for those who prefer to use the plain curling iron or waver rod. This is made large enough to take the largest curling iron and is constructed of satin finish aluminum throughout. It is 2½ by 6½ by 3¼ inches in size and weighs 1½ lbs.



Electric Humidifier

A device for humidifying and deodorizing the air in hotels, homes and other places, has been placed on the market by the Ingersoll Electrical Products Company, 109 West Austin Avenue, Chicago, Illinois. The action of the device has the effect of an indoor fountain, but no water connection is required. With each humidifier is furnished a rattan basket about 2 inches high and 17 inches diameter. The humidifier pan sets in the basket and hides the nickel plated outside of the lower portion of the pan. All metal parts are nickeled and the dome is ivory tinted; current consumption is about 60 watts. The spray ring, globe, rheostat and cord are shipped in a 13 by 13 by 13 inch package weighing about 11 lbs., and the pan and rattan basket weigh about 8 lbs.

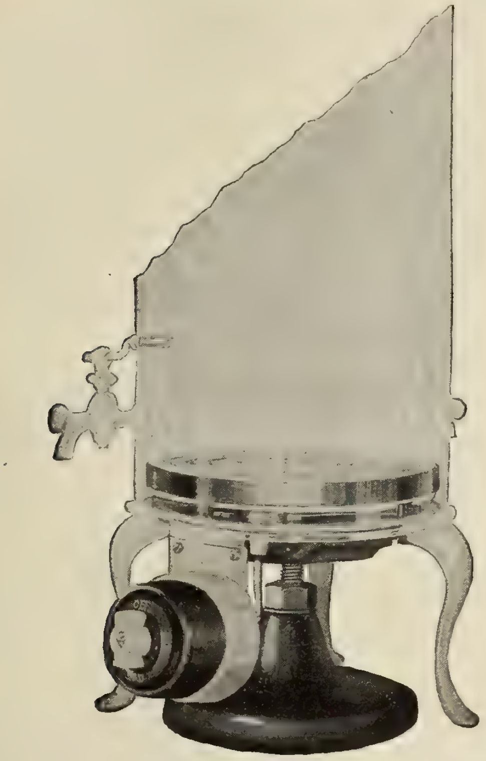


Royal Electric Cleaner

The Continental Electric Co., 505-11 King St. E., Toronto, Ontario, are marketing the Royal Electric Cleaner, of which the general design is shown in the accompanying illustration. The cleaner is of the "air alone" type and the manufacturers claim growing popularity for this feature. It is stated that the best materials are employed in the construction of this cleaner. Further claims are made as to its durability and general efficiency of design. Munderloh & Co., Ltd., Montreal, Quebec, are also distributing this cleaner.

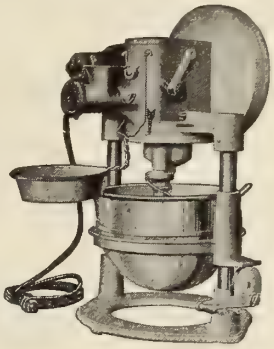
Electric Coffee Urn Heater

An electric coffee urn heater designed for use in hotels, restaurants, cafeterias, or where ever large coffee urns are used, is being made by the Westinghouse company. This heater gives a temperature at three different heat intensities and is operated by means of a three heat indicating snap switch. The base is made of cast steel with a black japan finish and is adjustable so that the heater can be raised or lowered to the most efficient position under the bottom of the urn. The heating element is of the standard Westinghouse exposed coil type. The heater is made in two sizes, 8 and 10 inch, two wattages and several voltages. The eight-inch size is designed for use with five and six gallon urns and the ten-inch size for urns of larger capacities.

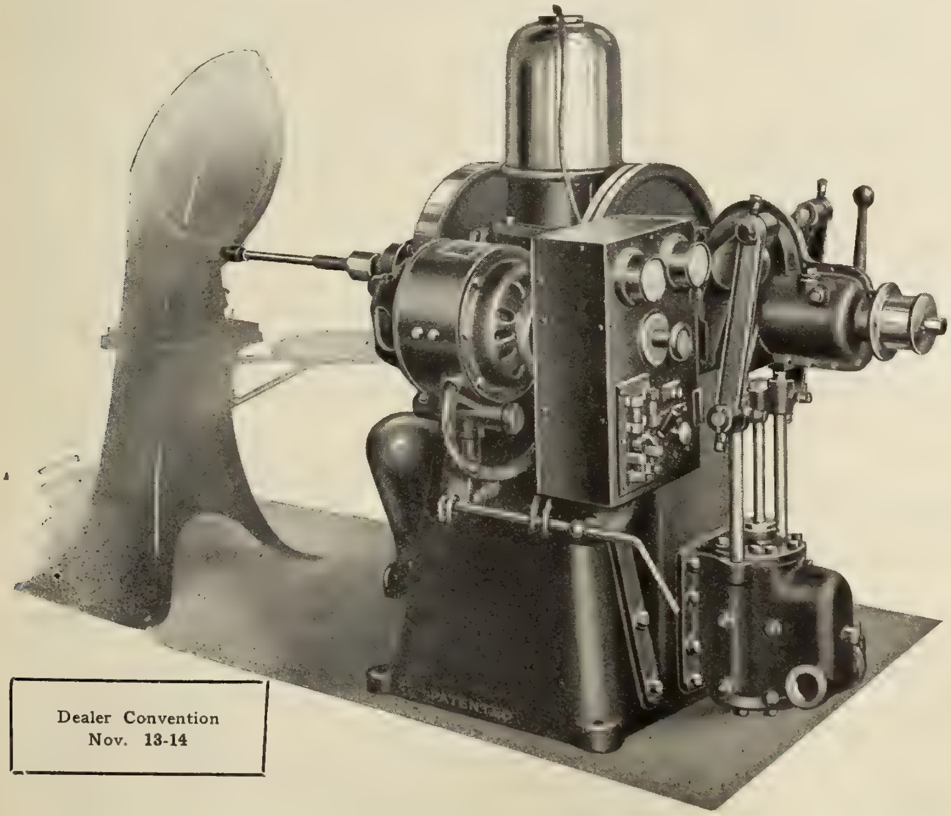


The Mixonette

The Read Machinery Co., York, Pa., are marketing under the name "Mixonette" a machine designed to do the work of mixing, beating and slicing in hotels, restaurants, etc. The machine has two speeds, clutch, beaters and bowl and is finished in white enamel. Equipment includes a 10 quart bowl, whip and beater, and the machine may be adapted for meat and food grinding, vegetable slicing, coffee grinding, etc. A 1/8 h.p. motor is used.



Come to the Convention, Nov. 13 and 14.



Dealer Convention Nov. 13-14

Caron Light Water and Power Plant

An isolated plant for farm purposes has recently been put on the market by Caron Bros., Inc., Montreal, Canada. The accompanying illustration shows the general assembly. Construction embodies water cooling, 1,000 watt generator, switchboard and self starter, 700 g.p.m. water pump, belt pulley from engine for driving grinder, churn, woodsaw, etc., storage battery, friction drive for cream separator and vacuum pump for milking machine. Either 32 or 110 volt generator can be supplied; it is driven from the engine flywheel. The engine is 3 h.p. and runs at 900 r.p.m. It operates on the two-cycle principle, with special construction so that compression takes place in the lower end of the cylinder. The battery is of the "Hart" glass jar type and can be furnished in 90, 150, 180 or 210 ampere hour capacity.

Current News and Notes

Brantford, Ont.

The rates on street lighting have been increased. They will mean an increase in cost of approximately $6,500 per year to the city. The increase is rated as follows: 100 watt tungsten lamps from $6 to $7. 150 watt tungsten lamps from $7 to $8, 200 watt tungsten lamps from $9 to $10, magnetic arc lamps from $30 to $40.

Calgary, Alta.

Hydro-electric development, which would save Calgary approximately $250,000 annually, is advocated by Commissioner A. J. Samis in a statement made recently. The commissioner proposed a Hydro-electric scheme financed by the provincial government, the current to be distributed radially to all the towns and cities within feasible radius of the central plants.

The Brotherston Electric Company have just completed the contract for wiring and lighting fixtures for the memorial hall of the G.W.V.A., at Calgary, Alta., at an estimated cost of $2,160. The billiard-room is equipped with "Brascolite" lighting fixtures.

Howden and Hudgings, electrical contractors and dealers, of Calgary, have recently been awarded the wiring contract for the light, heat and eelephone systems for the Radio Block, situated on 13th Avenue and 1st street, West, Calgary, for W. R. Hull & Company, owners; also installing nine McClary electric ranges, together with nine Cutler Hammer 3,500 watt water heaters. W. R. Hull & Co., are supplying ranges and water-heaters separate from wiring contract.

Mr. W. H. Whitney of Calgary won first prize in the sales contest recently put on by the Eureka Vacuum Cleaner Company. The prize won by Mr. Whitney was three Eureka cleaners. The company's idea was to show that a little extra effort during the summer months would be productive of results, and Mr. Whitney succeeded in making a fine demonstration in support of this theory.

Cobalt, Ont.

The listings of the courts which will try the two Hollinger suits in which Northern Canada Power Company figures, being plaintiff in one, have come out and they indicate that the appeal against the decision in the damage suit will be heard in October and the action for "specific performance" about November. The action for specific performance is Northern Canada Power Company's effort to secure the signing of a contract which it is alleged Hollinger agreed to sign and said to cover all required power for the life of the mine. The other action is in the appelate court and is Hollinger's appeal from the decision in its suit for damages arising out of a shortage of power in the winter of 1920-1921.

Emerson, Man.

The town of Emerson is installing a distribution system, purchasing power from the Pembina Light and Power Company, Pembina North Dakota. Geo. L. Guy, Winnipeg, is consulting engineer.

Fort William, Ont.

The partnership between H. G. Earley and W. H. Cowley. who carried on business under the name of Fort William Electric Company, has been dissolved. Mr. Cowley is carrying on the business at the same address, 107 S. May Street.

Hamilton, Ont.

An investigation is being made by Mayor Coppley to see if the 20-cent rate per thousand gallons fixed for the water supply to the new Hydro station on Beach road is an unfair one. E. I. Sifton, Hydro engineer, stated that the 20-cent charge was wrong in principle, because power was sold to the Hamilton waterworks, and for street lighting purposes, at cost. The Ontario commission had argued for a 12-cent rate, such as was paid by the Hydro stations within the city limits. The 20-cent rate would come out of Hamilton in any case, as the cost of the water supply for the new station would be entirely charged against the city. The water is used for transformer cooling.

Kitchener, Ont.

The Doerr Electric Co., of Kitchener, Ontario, believes in tying up close to national advertising of the products they sell. They arrange with the news stands to let them put their rubber stamp on the advertisements of their products, thus letting folks know where the article can be bought.

Lacombe, Alta.

L. M. Whitecotton, has recently opened an electric shop at Lacombe, Alta. He will do electrical contracting in addition to merchandising.

London, Ont.

The Public Utilities Commission has decided to raise industrial power rates nine per cent to offset an increase made in the cost of power from the Hydro-electric Power Commission. The local Commission was faced with a deficit of $25,000 or $26,000 on this year's operations as a result of the H.E.P.C. rate increase having been made retroactive to the first of the year.

Four tentative outlines for more adequate street lighting in London have been prepared by City Engineer H. A. Brazier and E. V. Buchanan, general manager of the public utilities commission. It is proposed to choose at random four blocks throughout the city and employ them as sample streets. Plan No. 1 will be a light on every pole in lieu of the light on every second pole as at present. No. 2. will be as at present, a light on every second pole; No, 3 will be larger lights on every second pole, while No. 4 will be bigger lights on every pole.

Montreal, Que.

Mr. F. A. Sabbaton, vice-president of the Laurentide Power Company stated recently that they were turning back into the Laurentide Company's electric boilers, which had been recently installed, power that meant a saving to the paper company of some 5,000 tons of coal per month. The Laurentide Power has been receiving payment since the first of July for 125,000 horsepower on its various contracts.

The outstanding feature of the annual report of the Montreal Tramways Company for the year ended June 30, 1922, now going forward to shareholders, is the increase of nearly $62,947 in net earnings, as compared with the previous twelve months period, despite a decrease of about $60,000 in gross earnings. This excellent result was due to a reduction in the operating expenses, from 75.63 per cent of gross in 1921, to 71.69 per cent for the past year.

The Board of directors of the Montreal Tramways Company was re-elected at the annual meeting of shareholders held at the head office recently. E. A. Robert, president, stated that financial conditions are improving and cost of operations lessened by the growing cheapness of money. In the last few years the revenue from passenger traffic decreased, but the turning point has been reached and the coming year will show an improved position.

The Eureka Vacuum Cleaner Co. have opened up a new retail store at 218 Craig Street, West, Montreal. This store is under the management of L. E. Seguin, who was formerly with L. C. Barbeau and Co. This makes the third store of the company in Montreal and we understand it is their intention to open others.

Toronto, Ont.

A recent report states that up to date the Hydro Commission has recommended and the Government has sanctioned by Order-in-Council a total construction of 508 miles in 70 townships throughout Ontario. Of the total projected mileage, 228 miles is actually built and the balance under construction, some of it nearing completion. The new construction has added 6,000 rural customers to the 2,000 that were previously taking Hydro power.

The report of the Northern Ontario Light & Power Company for the month of July shows gross earnings of $72,390, being an increase of $10,345 over July, 1921.

Welland, Ont.

President O. E. Fleming, of the Canadian Deep Waterways and Power Association, stated that a group of financiers were now prepared to buy the power proposed to be developed in connection with the deepening of the St. Lawrence, at a price that would cover cost of operation, maintenance, interest charges and sinking fund. He said that the price was based on the estimated cost of the project, over $252,000,000.

Windsor, Ont.

Albert E. Eastman, vice-president and general manager of the Windsor, Essex & Lake Shore Railway, met the Transportation Committee of the City Council, recently in regard to its application for a five cent fare to the new southerly city limits. He explained that so far as carrying the people to the newly established limits for five cents was concerned, the company would be perfectly satisfied, but it would mean, according to the franchise, a revising of the tariff zone districts and a heavy loss when figured out upon a basis of five cents off every through fare. Members of the committee saw his point and agreed to put the matter up to the Ontario Railway Board.

All but four of the 91 booths contemplated for the Pure Food and Electric show, which is to take place in the Windsor armories Octobed 16 to 21, are engaged, R. M. Jaffray, manager of the exhibition, announced recently. In the electrical section, all but one of the booths have been engaged. The show is under the auspices of the Border Cities Retail Merchants' Association.

Wiring Contracts Awarded

Aylesford, N. S.

O. E. Steeves, $5,000 res.; $3,000 res.

Ford, Ont.

G. W. Whelpton, 356 Hall Ave., $90,000 school, Drouillard Rd.

Glace Bay, N. S.

John Donovan, Margaret Street, $15,000 bank. Commercial St.

Guelph, Ont.

Arthur Knowles, High St. London, $325,000 school

Hamilton, Ont.

Culley & Breay, 35 King St. W. altn. to store & offices 116 King St. E.; $58,000 office bldg. & electrical store.

James Donaldson, 184 Charlton Ave., W., $37,000 res., Aberdeen Ave.

Inglewood, Ont.

Spratt & Son, Inglewood, on public school.

Kentville, N. S.

Perce DeFry, $6,000 res., Main St.

Kitchener, Ont.

N. Hagen, 34 Ellen Street, $10,000 res., Wellington St.

Star Electric Co., King Street, W., $4,000 Wilhelm St.; $5,000 Troy St.

Lachine, Que.

E. Miller, 141 Notre Dame Street, $6,000 res.

Leamington, Ont.

G. H. Whelpton, 356 Hall Ave., $65,000 high school.

Mimico. Ont.

Warner & Fordyce, $4,500 res., Mimico Ave.

Moncton, N. B.

Brooks, Lutz Street, $8,500 stores & res., High Street.

Wm. G. Crowley, St. George Street, $50,000 school, Lester Ave.

Thos. Johnson So., Marie Street, $6,000 res., Cornhill & Caledonia St.

Montreal, Que.

A. Allard, 162 Mt. Royal, E., $9,000 res., St. Denis St.

J. A. Anderson & Co., 205 Mansfield St., $500,000 council bldg. 255 Mountain St.

A. Barbeau, 146 Amherst St., $6,000 res., 829 Lagauchetiere E.

Booth Bros., 5727 Sherbrooke W., $24,000 three res., Westminster Ave.

A. Demers, 52-7th Ave., Ville St. Pierre, $8,000 res., (St. Clair St. Ahuntsic).

M. Deschenes, $10,000 res., Desjardins St.

J. George, $5,000 res., 1399 Notre Dame E.

R. Goulet, 3440 Letang St. $9,000 three flats, De Gaspe; and res on St. Hubert.

A. Lamarre, $20,000 two res., Melrose.

R. Meloche, 1360 Gertrude St., $15,000 res., Prud'homme.

R. S. Muir & Co., 32 Park Ave., $25,000 two res., Mayfair Ave.

O. Noel, 78 St. Timothee St., $7,000 res., Girouard.

E. Robillard, 255 Hamilton St., $7,000 res., Harvard Ave.

A. Romeo, 2112 Orleans Street, $16,000 six flats, 4th Ave.

J. St. Louis, $9,000 three flats res., Christophe Colomb Street.

R. Talbot, 2112a Boyer Street, $15,000 four res., 1961 Chambord St.

Vallee & Hamelin, 1867 St. James St., $10,000 bungalow, Brock Ave.; $18,000 pr. semi-det. res., Westminister Ave.

Uptown Electric, 926c St. Catherine W., res., 134 Brock Ave.

Niagara Falls, Ont.

A. Green, Walnut Street, $10,000 res., Bampfield St.

Oakville, Ont.

B. E. Sprowl, $3,000, stables, , Dundas St.

Ottawa, Ont.

Art Davis, Bronson Ave., $10,000 res., Clemow Ave.

Dalhousie Electric Co., Dalhousie Street, $4,500 res., Baird St.

Mr. Lee, $6,500 res., O'Connor St.; $5,000 res., Ossington Ave.

Mr. Milks, $9,000 double res., Belmont Ave.

Rideau Electric Co., Daly Ave. $5,000 res., Spadina Ave., Ottawa.; $4,000 res., Kenora Ave.; $4,500 res., Fentiman Ave. $5,500 res., Julian Street.

Stan Lewis, 63 Metcalfe Street, $35,000 Merivale Road.

G. Young, Hampton Ave., $5,000 Ossington Ave.

Outremont, Que.

A. L. Allard, 162 Mt. Royal E., $20,000 cottage, Holyrood Ave.

E. Brignall, $20,000 three flats, Outremont Ave.

E. Hodge, 6 Cuthbert St., $100,000 apt house, Bernard Ave.

A. St. Jean, 1964 Clarke St., three res., $18,000 Outremont Ave.

G. Sherrington, 2215 De La Roche St. $9,000 cottage Davaar Ave.

Point Grey, B. C.

Douglas J Metcalf, 103 Carter Cotton Bldg., $35,000 res., Marine Drive.

Regina, Sask.

Lorne Electrical Co., Smith Street, Regina, $3,000 res., Dewdney St.

United Elec. Co., Ltd., 1818 Cornwall St. Reg. $4,000 res., 16th Ave.

Riverside, Ont

G. Whelpton, 356 Hall Ave., $15,000 municipal bldg. Louizon Rd.

St. Catharines, Ont.

F. E. Carley, 19 Jones St., $10,000 res., Hillcrest Ave.

J. Desand, 187 St. Paul Street, $9,000 res., Hillcrest Ave.

Eckert & Dunnet, 21 Queenston St., on business block St. Paul & Chestnut Streets.

H. W. Homes, 30 Ann Street, $2,500 res 198 Geneva St.

J. H. Sandham Co., 179 St. Paul, $8,000 res., Queenston Road.

Sandwich, Ont.

Harris & Marson, 81a Parkway Ave., Toronto, $125,000 sanitarium, Prince Rd.

S. Woodison, Karl Place, $11,000 three family terrace, Randolph St.

R. Greenwood, 812 Queen St. E., $2,500 store Queen Street E.

Taylor Bros, Gore Street, $3,500 res., Wilson St.

W. Gaul, Charles Street, $4,500 res., Birmingham St.

M. I. Higgins, Ontario Street, $6,000 two res., Avondale Ave.

Toronto, Ont.

Geo. Armstrong, 1217 College Street. $4,500 each four res., 255-61 Briar Hill Ave.; $13,000 res., 283 Inglewood Dr.; $13,000 res., Glenview Blvd.

Harry Alexander Ltd., 6 King W., on large res., Bayview & Lawrence, York Twp.
Avenue.

Mr. Barnes, $80,000 eight stores, Bloor St. & Pauline

Bayview Electric Co., $7,500 add, store, rear 378-80 Yonge St.

Bobenizer & Robson, 409 Margueretta Ave., on Church, Royce & Perth Ave.

Clegg Bros., 79 Blackthorne Ave., $6,000 res., Glenrose Ave.

Phil. Coe, 32 Kennedy Ave., $10,500 res., Baby Point Rd.

W. A. Dean, 146 Jarvis Street, $125,000 warehouse, Front W. & Windsor St.

W. Dellow, 1935 Gerrard E., $5,000 each two res., 160-2 St. Clair Ave. E.

Douglas Bros., 2317 Yonge Street, $4,500 res., 68 Roselawn Ave.; $3,500 res., 204 Erskine Ave.; $10,000 each two res., 1-3 Glenrose Ave.

D. Firth, 79 Law Street, $10,000 each two bungalows, Fairview Ave.; $9,000 each two res., 40-2 Evans Ave.

J. Fraser, $7,000 pr., two pr. res., Roehampton Ave.

E. McNiece, Long Branch, $3,000 grocery store, Lake Shore.

A. J. Morrison, 269 Albany Ave., on store 127 Yonge St.

Moss & Stocks Elec. Co., 1145 Yonge St. on res., Glen Grove Ave., E.

H. S. Norris, 37 Fermanagh Ave., $9,000 each four res., 433-5-7-9. Runnymede Rd.

Patterson Electric Co., 43 Fermanagh Ave., $150,000 add. dairy, Walmer Rd.; $45,000 sunday school Galley Ave.

A. Richardson, 23 Herbert St. $4.500 res., Sheldrake Blvd.; $8,000 1 pr. res., Sheldrake Blvd.

Mr. Sheppard, $9,000 res., 246 Armadale Ave.; and two res., Willard Ave.

Hugh Wilson, 262 Dovercourt Road, $10,000, each five bungalows.

Viking, Alta.

Meathey & Jones, Viking, $2,300 town hall.

Wallaceburg, Ont.

Harrisons Electric Co., Wallaceburg, $63,080 school.

Westmount, Que.

S. J. Holwell, 276-2nd Ave. Verdun, $6,000 add., res., 4470 Western Ave.

Winnipeg, Man.

Schumacher, Gray Co., Ltd., Portage Ave E. $119,000 garage & show room, 251-7 Main Street.

Union Elec. Co., 313 Carlton St. Wpg., $22,000 laundry, Burnell.

Windsor, Ont.

H. P. Hutchinson, 833 Wyan Dotte St., W., $4,300 res., Dougall Ave.

A. McPherson, 1425 Cataragui Street, $4,500 res., Windermere Rd.

Chas. Usher, 9 Aylmer Ave., $10,800 res., Victoria Ave.

Trade Publications

The Northern Crane Works, Ltd., Walkerville, Ont., has issued a little bulletin, No. 24-G. It is described as a "pigeon-hole reminder" that they manufacture several types of electrical travelling cranes, gantries and electric hoists; also make hand power travelling and jib cranes of various

Announcement is made that the Westinghouse Electric & Manufacturing Company has become agent for the DeLaval transformer oil purifiers and dehydrators. This make of apparatus, which operates on the centrifugal principle, is equally well adapted to the removal of sludge from lubricating oil and to the dehydration and purification of transformer and other insulating oils. Some of its distinctive features are that it is simple and effective in operation, reduces the expense of dehydration, is rugged in construction, and uses no filter medium of any kind, thus eliminating a source of delay and expense.

The National X-Ray Reflector Co., of Chicago, have a most attractive folder on "Color Lighting in Show Windows." A particularly interesting phase of the discussion is the effect of colored light on different colors of merchandise. This is shown in the folder in actual color effects; for example, red light on blue article gives the effect of purple and on amber gives yellow; green on red gives pink, amber on blue gives green. Few merchants realize these facts when preparing their window display, and the electrical contractor dealers would appear to have a profitable harvest ahead of him if he is properly equipped with the necessary information on illumination, to coach the merchant in the proper way to obtain more accurate results in the way of color effects.

If you were in business for yourself would you give yourself a job?

Retail Marketing Tips

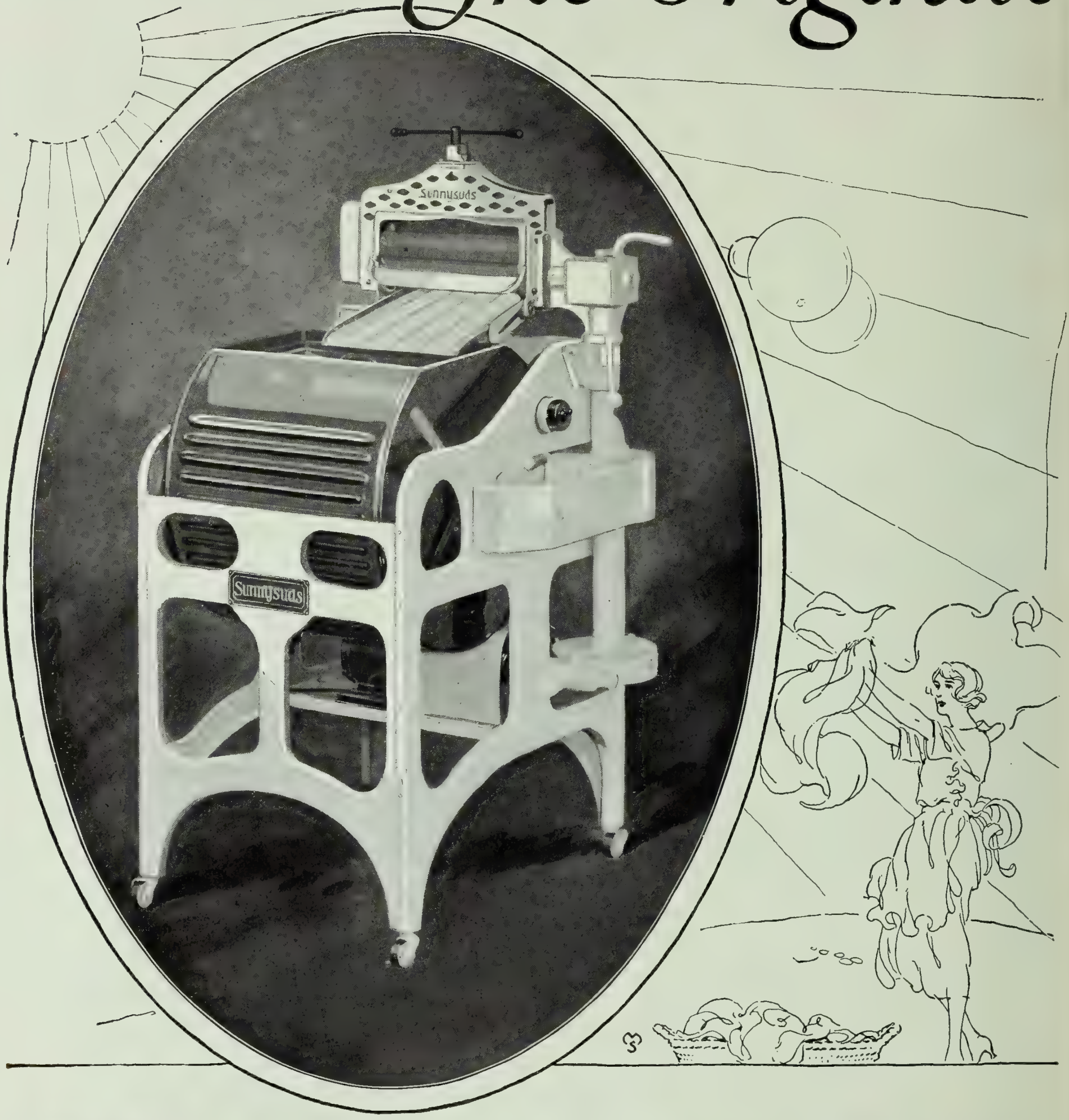
Washing Machines

—*That will make you money*

Points to Remember in Selling Washing Machines

1. It's the emancipation of washboard slavery.
2. Electric washers ***will clean clothes.***
3. A demonstration in the home is worth two in the store.
4. The cost of operation is negligible.
5. Best results are obtained by offering an extended time payment plan.
6. Be sure the purchaser understands all points in connection with the correct operation of the machine.
7. Women make the best demonstrators.
8. Not more than 10% of wired homes have electric washing machines.
9. Keep in touch with every customer periodically. A little "Service" covers a multitude of complaints.
10. Don't try to sell anybody else an electric washing machine until you are ***thoroughly sold yourself.***

The Original



Sunny

Moderately Priced Cabinet Electric Washer

The Sunnysuds Has Lost None of Its Sensational Appeal. Still the Acknowledged Leader

The astounding success of the Sunnysuds from the day of its announcement 18 months ago, has resulted in its being accorded the highest tribute possible—that of nationwide approval.

That the Sunnysuds should have enjoyed an amazing popularity from the outset is easy to understand. It was the first high-grade, all-metal cabinet electric washer to retail at a moderate price. It was announced at a time when the public was unwilling to purchase higher priced washers, and was actually waiting for a machine within reach of its purse; and when dealers, unable to move higher-priced washers, were eagerly seeking one that could be sold in volume—and with profit.

So it is easy to understand why our first year's output exceeded 20,000 Sunnysuds, and why the number of dealers actually selling this remarkable washer should increase from none to more than 1100 in the same time. It is also easy to understand why others have freely adopted the idea originated by Sunnysuds, of building a washer to sell for a moderate price.

The Sunnysuds of today is even better than the original Sunnysuds which created such a sensation, and won such enthusiastic approval on the part of dealers and the public. It embodies sound refinements and improvements made in accordance with our established policy of bettering our product wherever possible.

With its marvelous action tub that is the result of many months experimentation and development, and with every part and detail having successfully withstood the gruelling test of service in 20,000 homes, the Sunnysuds today is not only the original, but we believe, the *finest* all metal, moderately priced, standard size, cabinet electric washer!

Although our dealers number over 1100, there are still some localities where able, aggressive dealers can secure the valuable Sunnysuds franchise. Perhaps your town is one of them. Write at once for complete details.

ONWARD MANUFACTURING COMPANY
Kitchener, Ontario.

(30)

suds Electric Washer & Wringer

It has been proven that each "Colonial Maid" Blue Bird Washer directly sells 5 more

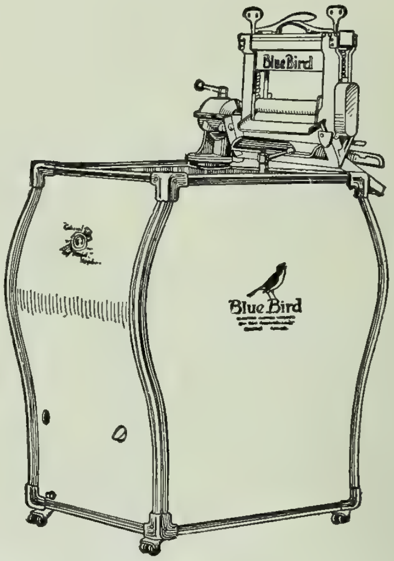
"COLONIAL MAID" WASHES BETTER

Blue Bird

ELECTRIC CLOTHES WASHER

Isn't that the kind of article you want to sell?

The improved "Colonial Maid" Blue Bird sells more readily than others because:—



It is known to be the most efficient and quickest.
It has the best appearance of any washer.
Its 4,000 satisfied users are always advertising it.
Its entirely enclosed cabinet makes it safe.
It is all Canadian made and fully guaranteed.
Write for details of our exclusive agency and time payment financing plan.

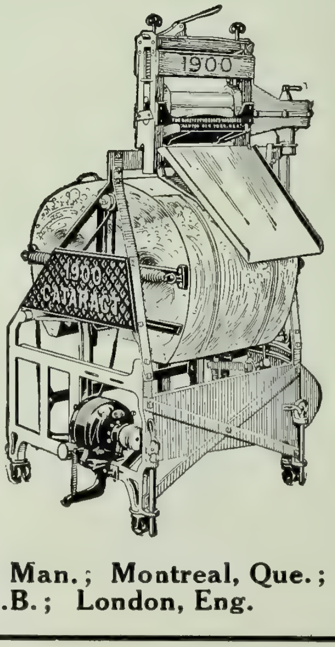
BLUEBIRD CORPORATION LTD.,
Brantford, Ontario

1900 Cataract

Electric Washer

ANNOUNCING an improvement in the service and sales of the wonderful "1900" Cataract Electric Washer

Every merchant selling and servicing this product should order samples now and prepare to push it for a heavy Christmas trade by cashing in on the reputation it has established and the demand already created. Its many exclusive time and labor saving features will make an irresistible appeal and double your sales.



"I'm the figure Eight"

Beatty Bros. Limited, have purchased the entire business of the "1900" Washer Company of Canada and will carry out the guarantee of the "1900" Washer Company to the letter.

Write our nearest branch today

BEATTY BROS. LIMITED

BRANCHES AT: Fergus, London, Ont.; Winnipeg, Man.; Montreal, Que.; Edmonton, Alta.; Vancouver, B.C.; St. John, N.B.; London, Eng.

A B C's
Sure are Selling!

The finest washer built

Cylinder reverses after each revolution

Aluminum wringer—locks in any of 20 positions

50% oversize motor

All gears machine cut

Quiet and vibrationless in operation

At Vancouver, the David Spencer Company—a new A B C dealer—sold 18 *Super Electrics* at $180 each during the first two weeks. Latest reports indicate that this pace is being splendidly maintained.

Strickland, Swain & Patrick, recently appointed as A B C Distributors in British Columbia, are out to help their other dealers in a similar manner.

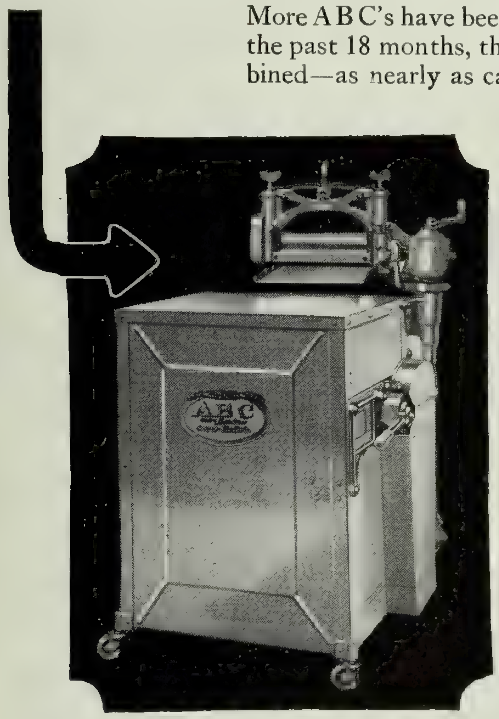
About fifty A B C *Alco's* have been sold so far this year by Ellis & Howard at Kitchener, Ontario—a city of approximately 20,000.

More A B C's have been sold in the Maritimes, the past 18 months, than all other makes combined—as nearly as can be determined. Blackadar & Stevens, the A B C Distributors, are on their toes assisting our dealers along real specialty selling lines.

These are just a few examples. Space forbids quoting more. In every province, A B C's are selling fine. In fact the A B C Line is showing the most rapid gains in sales of any important line of electric washers on the market.

An established reputation, matchless values, a complete line, liberal dealer discounts and real co-operation—these are some of the principal reasons that are making the A B C Line the leader.

Get our proposition. It bristles with good features. Write or wire today.



A B C "Alco" Washers
(Dolly or rub board)

No. 51, single tub, engine drive
No. 52, double tub, engine drive
No. 51-E, single tub, 1/4 h. p. motor
No. 52-E, double tub, 1/4 h. p. motor

A B C Electric Oscillator

Greatest value ever offered at the price. Full size 6-sheet copper tub, swinging wringer, springless mechanism. Rigid frame. Enclosed parts.

No. 80-E $135

A B C
SUPER ELECTRIC
$170

With Copper Tub—$200

All prices quoted are retail, except in B. C. and the Maritimes

ALTORFER BROS. COMPANY, Peoria, Illinois
Pioneer and Leading Makers of Washers and Ironers

Canadian Office, Box No. 123, Brantford, Ont.

Wholesale Distributors

MARITIME PROVINCES
Blackadar & Stevens, Roy Building, Halifax, N. S.

ONTARIO
Masco Co., Ltd., 78 Richmond St., Toronto

ALBERTA
Cunningham Electric Co., Ltd., Calgary

QUEBEC
Dawson & Co., Ltd., 128 Bleury St., Montreal

SASKATCHEWAN
Sun Electrical Supply, Ltd., Regina

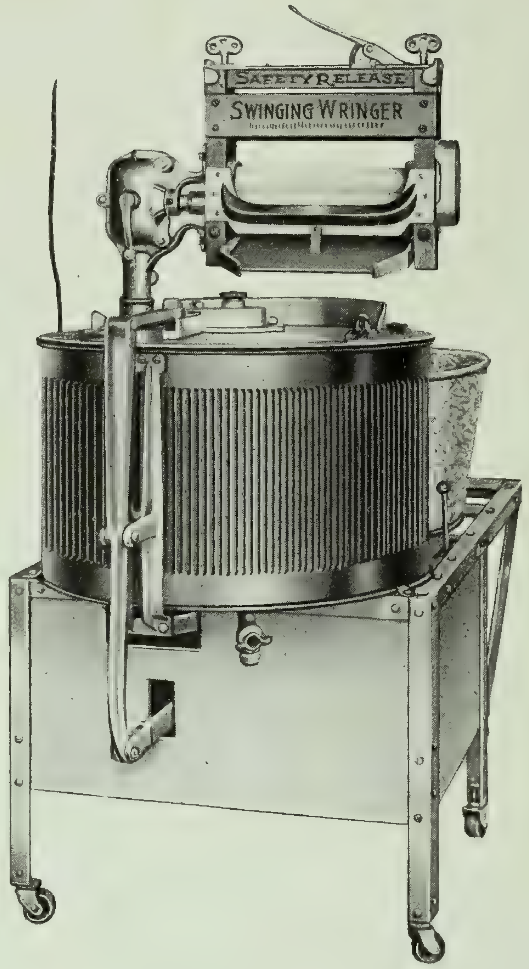
BRITISH COLUMBIA
Strickland, Swain & Patrick, 707 Fort St., Victoria

ANNOUNCING

The

Connor Copper Tub Electric Model 4C

which further completes the Connor Line.



A Few of Its Unrivalled Features:

Polished Copper Tub

Polished Aluminum Cover

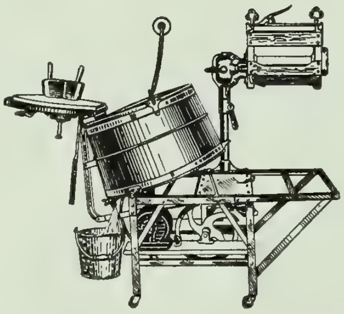
Polished Aluminum Feed Board and Drain Board on 12" Swinging Wringer

Steel Stand Galvanized

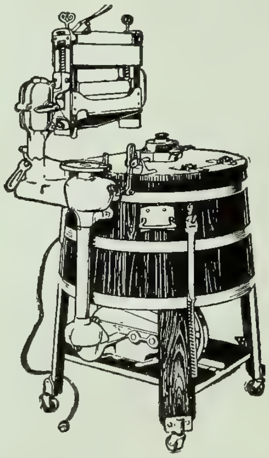
¼ H. P. Motor

Extension Folding Bench

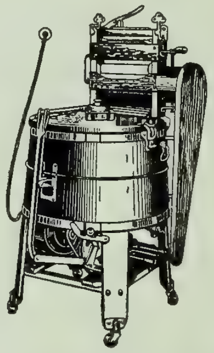
Easy Rolling Casters



Connor Electric Model 2 Wood Tilting Tub Swinging Wringer



Connor Perfection Electric Swinging Wringer



Connor Economy Electric Stationary Wringer

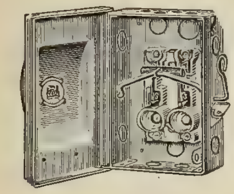
J. H. Connor & Son Ltd., Ottawa, Ont.

311 Chambers St., Winnipeg, Man. **McPherson & Dietzel, Vancouver, B.C.**

—This trade mark protects you

The line that always satisfies

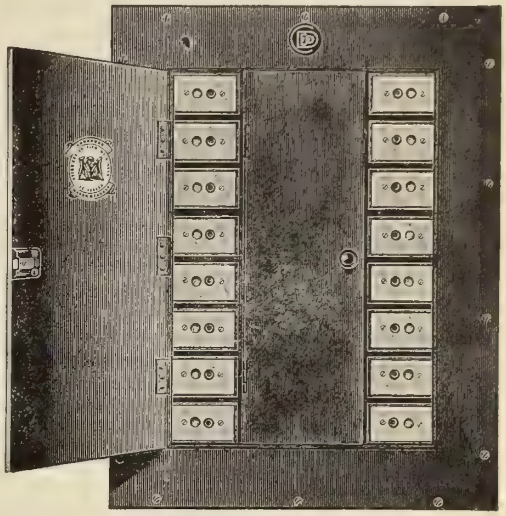
Nothing but the highest grade materials and the most efficient workmanship are allowed to enter into the manufacture of C.D. & E.B. Co's products. Consequently they give maximum service and satisfaction to the consumer and protect the name of the contractor who instals them.



Service Box
Cat. No. 1020

A few of our products:

Flush Type Cabinets, Motor Starters, Type E Boxes, Loom Clips, Meter Protectors, etc.—all made in Canada, by Canadians with Canadian capital, complying with H.E.P.C. and Underwriters regulations.



C.D. & E.B. Co's. Special Dead Front Lighting Panel. This Panel is made up in any number of Circuits required, and is equal to anything on the present market.

Canadian Drill & Electric Box Co., Limited

1402 Queen St. East, Toronto, Ontario Phone Gerr. 554

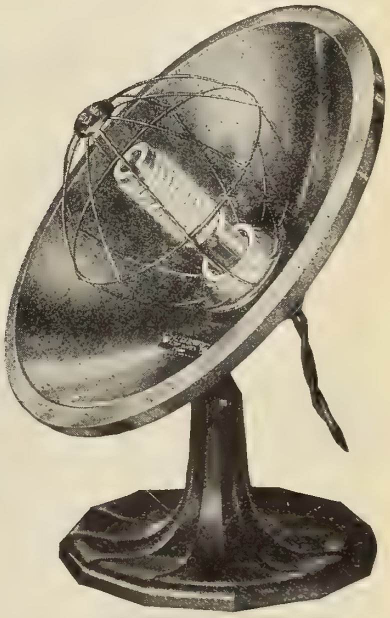
If Winter Comes

Will anyone hesitate to spend $7.^50 to obtain an Electric Heater such as ours?

Are you prepared with a big enough stock?

Read this specification and consider the price

Solid copper reflector 11″ diameter, beautifully burnished. Cast iron base weight 2½ lbs., dia. 7″, fluted design. Base and back of reflector finished in indestructible black enamel—adjustable reflector. Filament equal to any on the market. 600 watts, 110 volts A C or D C. Equipped with 7 feet standard underwriters approved cord and two piece separable attachment plug.



Gilbert Polar Cub Electric Heater $7.50

You cannot order too quickly—Act now

The A. C. Gilbert - Menzies Co., Limited

439 King St. W.
TORONTO

DISTRIBUTORS WANTED

For province of Ontario, also Winnipeg and West and Montreal East. Standard electrical line, exclusively controlled. Excellent, dependable proposition for party or firm alone or side. Must have connection and be financially competent to handle sales and assume account upon shipment up to $10,000. We carry stock in Toronto; will ship to distributor or customer. Confidential. Box 32, Electrical News, Toronto. 20

Power Resources of British Columbia

In British Columbia central station development has taken place principally by the British Columbia Electric Railway Company at Vancouver and at Victoria and by the West Kootenay Power and Light Company at Bonnington Falls. Pulp and paper mills and mines, such as at Anyox, Powell river and so forth, also use large amounts of power, but none is retailed to other industries.

In the whole province a total of approximately 3,000,000 horse power is available. In the vicinity of Vancouver the B. C. Electric Railway company has harnessed 136,000 horse power at its Lake Buntzen and Stave Lake plants.

Mathematically Speaking

Septimus Wagge met his chum the other day.

"I say, Bill, I watched a wonderful machine at our shop this morning."

"And how does it work?" asked Bill.

"Well," was the reply, "by means of a pedal attachment, a fulcrumed lever converts a vertical reciprocating motion into circular movement. The principal part of the machine is a huge disc that revolves in a vertical plane. Power is applied through the axis of the disc and work is done on the periphery, and the hardest substance, by mere impact, may be reduced to any shape."

"What is this wonderful machine?" asked Bill.

"A grindstone," was the reply.

NEW AND USED

MOTORS

In Stock for Immediate Delivery

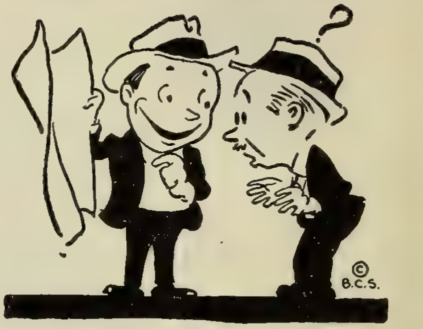
100 h.p., 3 ph., 25 cyl., 550 volts, 710 r.p.m.
60 h.p., 3 ph., 25 cyl., 550 volts, 750 r.p.m.
52 h.p., 3 ph., 25 cyl., 550 volts, 720 r.p.m
50 h.p., 3 ph., 60 cyl., 550 volts, 970 r.p.m
50 h.p., 3 ph., 25 cyl., 550 volts, 720 r.p.m.
35 h.p., 2 ph., 60 cyl., 200 volts, 1150 r.p.m.
30 h.p., 3 ph., 25 cyl., 550 volts, 750 r.p.m.
30 h.p., 3 ph., 25 cyl., 550 volts, 1500 r.p.m.
25 h.p., 3 ph., 25 cyl., 550 volts, 750 r.p.m.
15 h.p., 3 ph., 25 cyl., 220 volts, 720 r.p.m.
15 h.p., 3 ph., 25 cyl., 550 volts, 750 r.p.m.
15 h.p., 3 ph., 60 cyl., 220 volts, 1200 r.p.m.
13 h.p., 3 ph., 25 cyl., 550 volts, 700 r.p.m.
10 h.p., 3 ph., 66 cyl., 220 volts, 1333 r.p.m.
7½ h.p., 2 ph., 60 cyl., 200 volts, 1120 r.p.m.
5 h.p., 3 ph., 60 cyl., 550 volts, 1750 r.p.m.
5 h.p., 3 ph., 25 cyl., 550 volts, 1500 r.p.m.
3 h.p., 3 ph., 60 cyl., 550 volts, 1750 r.pm.
3 h.p., 3 ph., 60 cyl., 550 volts 1120 r.p.m.
3 h.p., 3 ph., 25 cyl., 550 volts, 1500 r.p.m.
3 h.p., 3 ph., 25 cyl., 550 volts, 1400 r.p.m.
2 h.p., 3 ph., 60 cyl., 550 volts, 1750 r.p.m.
2 h.p., 3 ph., 25 cyl., 550 volts, 1440 r.p.m.
2 h.p., 3 ph., 25 cyl., 550 volts, 1400 r.p.m.
1 h.p., 3 ph., 25 cyl., 550 volts, 1500 r.p.m.
1 h.p., 3 ph., 25 cyl., 110 volts, 1420 r.p.m.
1 h.p., 3 ph., 25 cyl., 220 volts, 710 r.p.m.
½ h.p., 1 ph., 60 cyl., 110 volts, 1725 r.p.m.
1/6 h.p., 1 ph., 60 cyl., 110 volts, 1725 r.p.m.
1/6 h.p., 1 ph., 60 cyl., 110 volts, 1150 r.p.m.

Machinery Supplies

Ask for our latest stock list

H. W. PETRIE, Limited

131-147 Front St. West, Toronto



How will MacLean Building Reports make money for you—that's the question you want answered. Here's the answer:

1—By eliminating missionary work on the part of salesmen and giving them real prospects to work on.
2—By giving you information that is so definite and positive that your men can be sent out with the assurance of arriving at the right time to receive a hearing.
3—By saving your wasted trips on hear-say information or hazy rumours.
4—By giving your salesmen definite prospects and definite projects upon which to work —thus instilling a greater confidence of success and a more genuine enthusiasm.
5—By getting contracts and jobs which you otherwise would have never heard of.

Rates and samples on request.

MacLEAN BUILDING REPORTS LTD

345 Adelaide St., W. - - - TORONTO
119 Board of Trade Bldg. - MONTREAL
325 Main St. - - - WINNIPEG
106 Winch Bldg. - - - VANCOUVER

Contact Heating

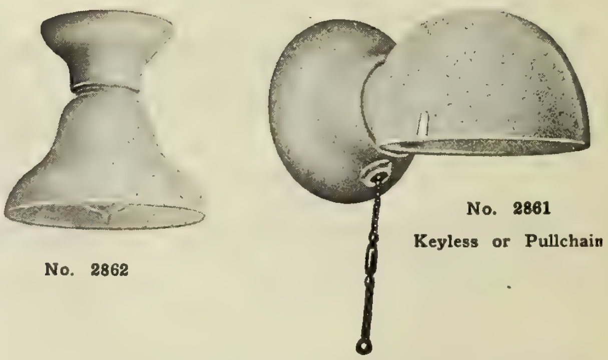
It is generally agreed that the best test is the heating test. We claim that I-T-E CIRCUIT BREAKERS will carry their rated load at a temperature rise not exceeding 20 degrees Cent. above surrounding temperature —that they are so substantially built as to repeatedly open the most severe short circuits without injury to their main contacts and so rapidly as to give instantaneous protection to the circuit, yet so accurately as to be correct within five per cent of the overload calibrations.

The CUTTER COMPANY
ESTABLISHED 1888 PHILADELPHIA

24 Adelaide St. E., TORONTO

VITROLITE

"Patented July 1922"



A complete new line of Sanitary Fixtures for bathrooms, kitchens, hospitals, etc.

Exposed metal parts are white vitreous (porcelain) enamel, which will not discolor, crack or peel, and is absolutely clean and sanitary, besides harmonizing perfectly with the surroundings. The reasonable prices will surprise you.

Write for particulars

Tallman Brass & Metal Limited
HAMILTON, ONT.

How to know the Best Brush for each Generator or Motor

COLUMBIA Data Sheet Service brings Nation-wide experience to bear on your brush problems. It goes far beyond the experience of any individual or of several individuals.

Columbia Data Sheet Service assures the correct Columbia Pyramid Brushes for each machine.

The specialists who secure the facts show on the Data Sheet the condition of each unit. The Board of Engineers carefully analyzes the Data Sheet for each machine. The brushes selected are guaranteed to be satisfactory.

Avail yourself of this service of specialists. It is yours for the asking, whether you have one machine or a thousand.

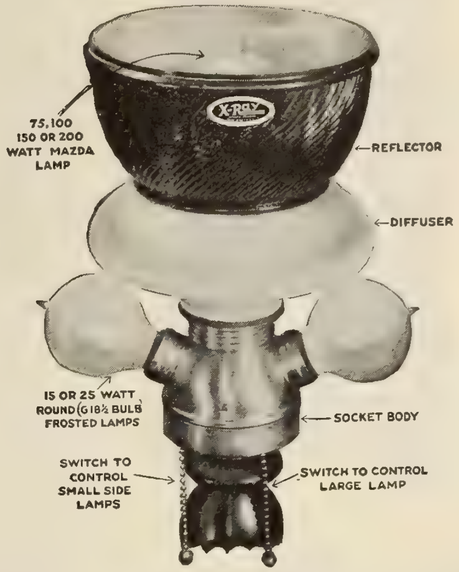
C N C

CANADIAN NATIONAL CARBON CO.
LIMITED
TORONTO - CANADA

2003

FLOODLIGHT

ANY ROOM WITH THIS


X-Ray
75,100 150 OR 200 WATT MAZDA LAMP
REFLECTOR
DIFFUSER
15 OR 25 WATT ROUND(G18½ BULB FROSTED LAMPS
SOCKET BODY
SWITCH TO CONTROL SMALL SIDE LAMPS
SWITCH TO CONTROL LARGE LAMP

X-Ray Curtis Adapter

It can be used in any art lamp to give local lighting as an ordinary lamp, or to light the entire room with a pleasant indirect illumination.

It can be mounted on any pedestal or vase and is especially recommended for houses, clubs and rest rooms.

Write for literature.

National X-Ray Reflector Co.

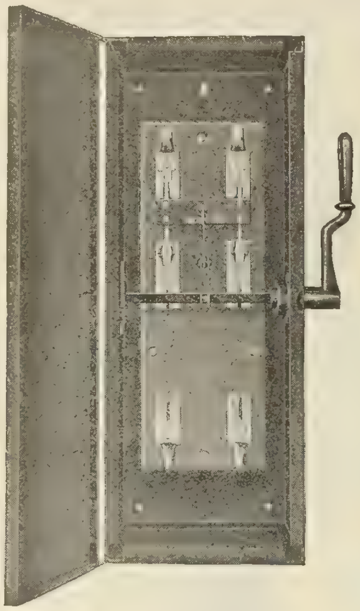
TORONTO	WINNIPEG
GEORGE J. BEATTIE	COCHRANE-STEPHENSON CO., LTD.
72 Victoria Street	602 Avenue Block

ENGINEERS IN ALL PRINCIPAL CITIES

This shows a Curtis Art lamp using only the local lighting.

Here the indirect light from the Curtis Art lamp floods the entire room.

A Contractor is Judged by the Materials he uses



Are those Safety Switches you installed the last year or so, standing up?

WE GUARANTEE

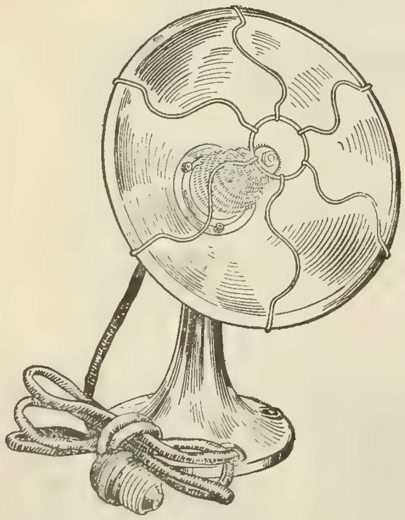
Devoe Safety Service Switches

Write for Bulletin No. 19

The Devoe Electric Switch Company

414 Notre Dame West, Montreal, and 105 Victoria St., Toronto, Ont.

Heating Appliances



Portable Air Heaters—All Styles
Heating Pads
Toasters—Regular and Turnover
Grills—Single and 3 Heat
Percolators
Curling Tongs
Waffle Irons

Full Stocks for
Immediate Delivery

UNIVERSAL—HOT POINT—
STAR—SUPERIOR

Great West Electric Co. Limited

Winnipeg

Motors in Stock

SECOND-HAND 3 PHASE, 60 CYCLE, 220 V. MOTORS

1—50 H.P. 900 RPM. Westinghouse, Complete
1—20 H.P. 1200 RPM. T.H.E., Complete
1—20 H.P. 1200 RPM. Westinghouse, Complete
1—15 H.P. 1800 RPM. C.W., Complete
1—7½ H.P. 1800 RPM. T.H.E., Complete
1—7½ H.P. 1200 RPM. A.C., Complete
1— 5 H.P. 1200 RPM. Westinghouse
1— 2 H.P. 600 RPM C.G.E.
1— 1 H.P. 1800 RPM. T.H.E.
1— 2 H.P. 1800 RPM.

SECOND-HAND 2 PHASE, 60 CYCLE, 220 V. MOTORS

1—50 H.P. 900 RPM. Westinghouse, Complete
1—24 H.P. 1200 RPM. T.H.E., Complete
1—16 H.P. 1800 RPM. T.H.E., Complete
1—7½ H.P. 1800 RPM. T.H.E., Complete
1— 3 H.P. 1800 RPM. T.H.E.
1— 1 H.P. 1800 RPM. T.H.E.
1—½ H.P. 1800 RPM. T.H.E.

SECOND-HAND 3 PHASE, 25 CYCLE, 550 V. MOTORS

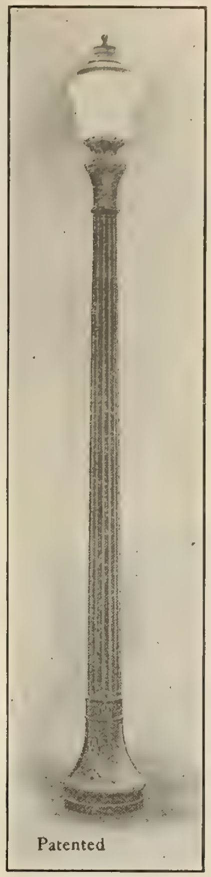
1—50 H.P. 750 RPM. Westinghouse
1— 5 H.P. 1500 RPM. T.H.E.

SECOND-HAND 3 PHASE, 25 CYCLE, 220 V. MOTORS

1—30 H.P. 750 RPM. Westinghouse
1—15 H.P. 750 RPM. T.H.E., Complete
1—10 H.P. 1500 RPM. T.H.E.
1— 1 H.P. 1500 RPM Westinghouse
1— 1 H.P. 750 RPM. T.H.E.
1— 5 H.P. 1500 RPM. T.H.E.

Toronto and Hamilton Electric Co., Limited

HAMILTON ONTARIO



Street Lighting Equipment

Up-to-Date Units

To meet every requirement of modern street lighting.

We also represent :
Weston Electrical Instrument Co.
The Bristol Co.
General Devices & Fittings Co.
G. & W. Electric Specialty Co.

A. H. Winter Joyner,
Limited
Toronto - Montreal

Radio Manufacturers

use

COPEL

A non-corrosive alloy
Resistance 298 ohms per cir. mil. ft.
Temperature coefficient nil

MADE IN CANADA

HIRAM WALKER & SONS METAL PRODUCTS, LIMITED

WALKERVILLE, ONTARIO.

Canadian Line Materials
Limited
TORONTO

Manufacturers of

Pole Line Hardware

Service Brackets

Rural Distribution Fixtures

Write for catalogue and prices.

SIGNAL

SELLING IS NO SNAP!

But when you sell Signal—whether Radio parts or sets, or any other Signal item—you sell satisfaction. Produced by a plant and an organization whose experience goes back 35 years, there is seasoned knowledge and experienced handicraft in every item. Its finish reflects its character—clean cut, accurate, workman-like in every detail. Each piece will give the service expected of it—and it "looks the part," which counts for a lot to the Dealer.

Rear view of one of our new Signal Junior Detector Units—a clever and popular arrangement by which a complete wide-range set may be built up, a unit at a time, the first and each succeeding unit complete in itself, but the whole augmented as each unit is added. You should post up on this new development. It is sure to be a big seller.

(1887A)

The *Signal* Line Includes—

- Radio Parts and Sets
- Bells and Buzzers
- Transformers
- Battery Chargers
- Medical Batteries Etc.

SIGNAL Electric Mfg. Co.

1903 Broadway, Menominee, Mich.

BULLETIN COUPON

Signal Electric Mfg. Co.,
1903 Broadway, Menominee, Mich.

Please send Bulletins as indicated by X below, to name and address written in the margin of this page.

☐ Radio Equipment.
☐ Bells & Buzzers
☐ Medical Batteries
☐ Bell Ringing Transformer
☐ Battery Charger
☐ Telegraph Instruments

WIRELESS

"ESCO" Motor-Generators for Generation of High Voltages

NORTHERN ELEC. CO.—Complete Peanut Tube Receiving Sets

JEWELL INSTRUMENTS

CONDENSITE-CELORON
BAKELITE—Complete assortment of Panels, Sheets, Tubes, Rods.

EVERETT PHONES, FROST PHONES

CHELSEA CONDENSERS

Price List on Application

Dealers are asked to write for special discounts

BROCK RADIO CO.

B. L. Silver—Radio Engineer

357 St. Catherine St. W. Montreal

Tenders Wanted

should be advertised for in the "Tenders and For Sale Department" of the CONTRACT RECORD AND ENGINEERING REVIEW. This paper is the "Tender Ad." medium of Canada and always brings bids from the reliable contractors and supply houses. File your plans for any work on which you are inviting bids in our offices at Toronto, Montreal, Winnipeg or Vancouver.

Contract Record
and Engineering Review
TORONTO - ONTARIO

JEWELL
JEWELL ELECTRICAL INSTRUMENT CO.
CHICAGO, U.S.A.

Write for
OUR NEW CATALOGUE
"Just off the Press"

Safe and Sure---

"ARMACELL"

A clear insulating varnish of absolute dependability, water, acid, alkali, and dust proof. Withstands vibration, shock, strain and overheating. Will not "throw-out" on high-speed coils.

"OHMALINE"

Similar to the above in a jet black.

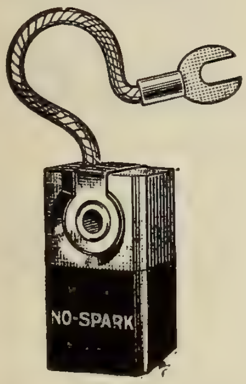
"PAKYDERM"

for finishing. In black or transparent, air-dries in thirty minutes with a tough, glossy, elastic protective coating, handsome in appearance, oil-proof, water-proof, dust-proof, heat-proof, acid-proof.

"You can trust Griffith's Products"

SPIELMAN AGENCIES (Regd.)
45 St. Alexander Street - Montreal
Ottawa..........J. W. Anderson, Bank St. Chambers
Toronto..Henry Engineering Co., 89 Wellington St. W.
Winnipeg..............Wm. A. Goold, 39 Charlotte St.
Halifax........R. R. Power, 311 Royal Bank Building

THERE ARE MORE EXPENSIVE BRUSHES—BUT NONE MORE EFFICIENT



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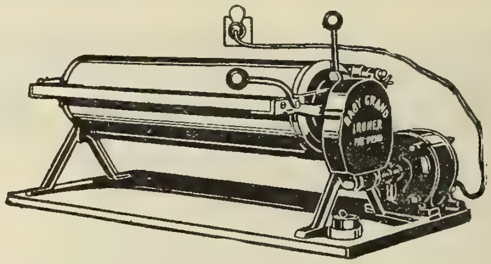

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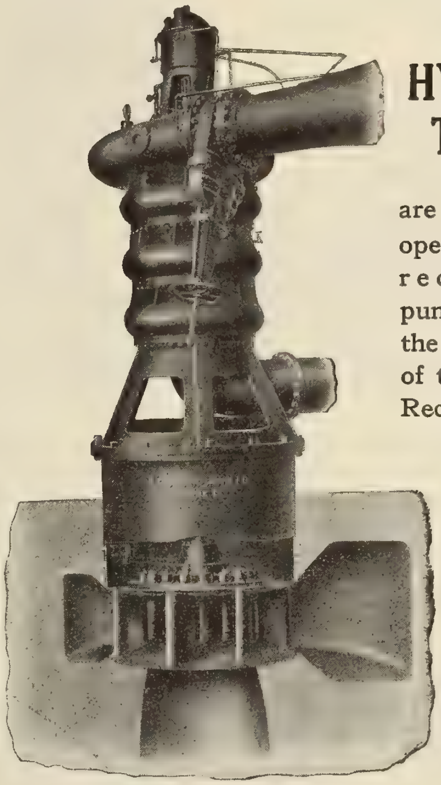

Accompanying view shows unit at Sunnyside, Wash., operating under 21 ft. head and pumping water to an elevation of 78 ft. for irrigation purposes.

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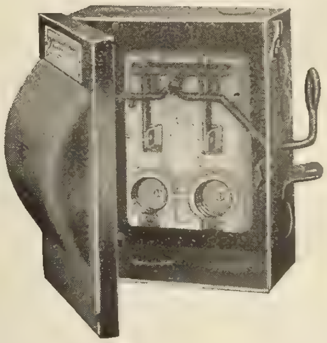

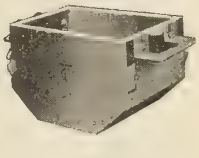

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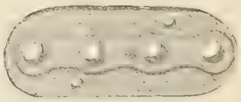

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Electrical Testing
Laboratories

"Electrical, Photometrical and Physical Tests and Inspections".

80th Street and East End Avenue, New York, N.Y., U.S.A.

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Trade Marks and Designs
Procured in all Countries
Special attention given to Patent Litigation
Pamphlets sent free on application
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Electrical Engineer
Plans, Specifications and Estimates
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Save Money by Advertising for your Tenders

Competition will keep bids on your work or supplies down to the minimum figure. An advertisement in the

Tender Department
of the
Contract Record
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will put you in touch with the great majority of reliable contractors, and help you get the best firm for the job and the right price for the work.

Use the Contract Record Tender Department for the next job.

CLASSIFIED INDEX TO ADVERTISEMENTS—CONTINUED

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National Electric Heating Company

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Kennedy, William & Sons
Rough Sales Corporation, George C.

STOP LOG WINCHES
Kennedy, William & Sons

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Canadian National Carbon Company
Exide Batteries of Canada, Ltd.

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Northern Electric Company
Winter Joyner Ltd., A. H.

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Davis Slate & Mfg. Company

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Canadian Johns-Manville Co.
Canadian Westinghouse Company
Chamberlain & Hookham Meter Company
Devoe Electric Switch Company
Electrical Maintenance & Repairs Company
G. & W. Electric Specialty Company
Moloney Electric Company of Canada
Square D Company
Schweitzer & Conrad, Inc.

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Canadian Johns-Manville Co.
Canadian Westinghouse Company
Devoe Electric Switch Company
Ferranti Meter & Transformer Mfg. Co.
Moloney Electric Company of Canada
Monarch Electric Company

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Monarch Electric Company

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Packard Electric Company
Northern Electric Company

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Canadian General Electric Company
Century Telephone Construction Company
MacGillivray, G. L. & Co.
Minnesota Electric Co.
Northern Electric Company

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VARNISHES
Spielman Agencies, Registered

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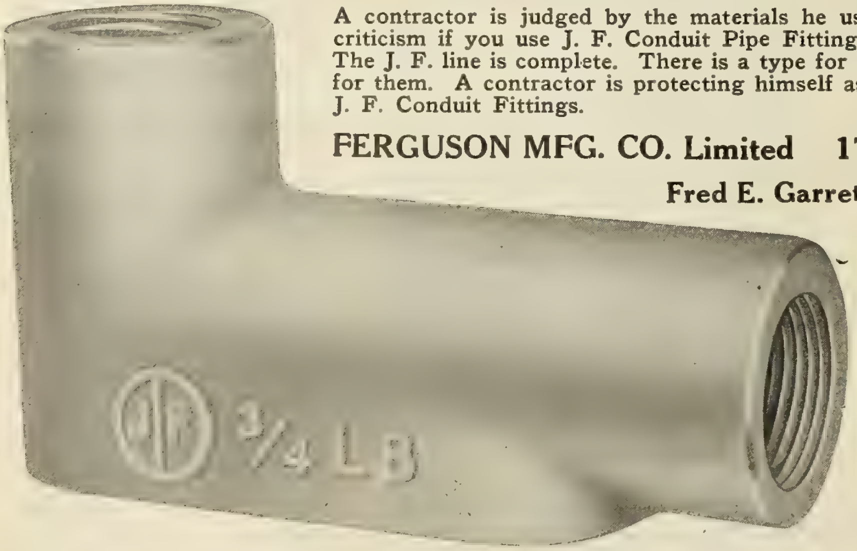
Canada Wire & Cable Co.
Northern Electric Company
Phillips Electric Works, Eugene F.
Standard Underground Cable Co., of Canada Ltd.

WIRING DEVICES
Banfield, W. H. & Sons
Canadian General Electric Company
Northern Electric Company

WOOD SCREWS
Robertson Mfg. Company, P. L.



CONDUIT FITTINGS

PRICES RIGHT QUICK SERVICE

A contractor is judged by the materials he uses. You will leave no opening for criticism if you use J. F. Conduit Pipe Fittings and Covers.
The J. F. line is complete. There is a type for every requirement. Ask your jobber for them. A contractor is protecting himself as well as his customer when he uses J. F. Conduit Fittings.

FERGUSON MFG. CO. Limited 174 KING ST. LONDON, ONT.

Fred E. Garrett & Co. Western Representatives
501 Confederation Life Bldg.
WINNIPEG, MAN.

If your Jobber cannot supply you write us direct.

Endorsed by Leading Electrical Contractors. Approved by H.E.P.C.
MADE IN CANADA

Send in Coupon to be placed on our mailing list to receive our monthly Calendar and Price Changes ☞

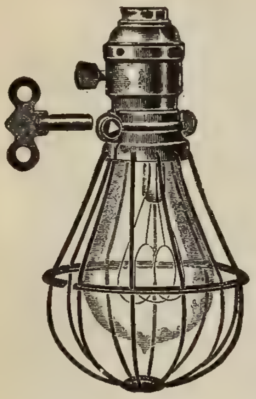
Ferguson Manufacturing Co. Ltd.
174 King St. LONDON, ONT.

Please place our name on your mailing list to receive monthly Calendar and Price Changes. This entails no obligation on our part.

Name ....

Address ....

City or Town ....



Safeguarding the Lamp

From Theft or Breakage

LOXON Does It!

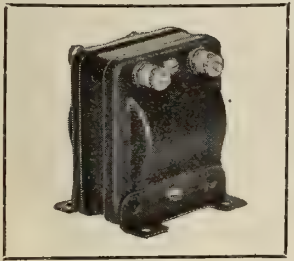
One turn of the key and the lamp can't come out. Loxon, the lamp guard, is popular all over America. It sells at a single price at a single glance.

Many other electrical specialties which will make money for you. Get in touch with us. Illustrated price lists free.

McGILL MANUFACTURING COMPANY, Valparaiso, Ind.

"United" Radio Products

"UNITED" AUDIO FREQUENCY TRANSFORMERS

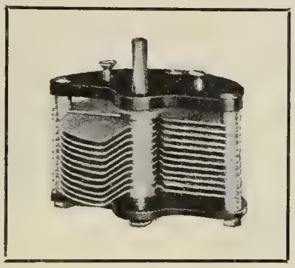


Two finishes; Black Enamel or Buffed Nickel Plated, $4.50

The beauty of the outside of this transformer is but a reflection of the superb workmanship under the shell—no howling—no distortion—clear amplification for one or more stages.

NOTE: Any advertised claim of having an arrangement with us to sell our products at special prices, is fraudulent.

"UNITED" VARIABLE CONDENSERS

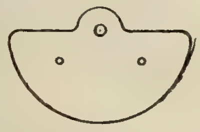


Prices

43 plate, $4.50; 23 plate, $4.00; 11 plate, $3.50; 5 plate, $2.75; 3 plate, $2.25, without dial or knob.

That "United" Condensers have become the standard with manufacturers of radio sets, by which all others are judged, is, in itself, the strongest endorsement of their superior construction and effectiveness.

Ask your dealer to show you this condenser. Then, you, too, will appreciate why it has been accepted as the standard.

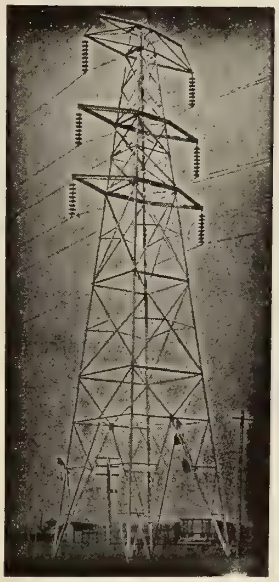


Mounting made easy by our template for locating panel holes; packed free with each condenser.

UNITED MFG. & DISTRIBUTING CO.

CHICAGO 536 Lake Shore Drive ILLINOIS

GALVANIZED STEEL TOWERS AND POLES



Standard Tower of the Hydro Electric Power Commission of Ontario

The modern means of supporting overhead wires.

Power Telephone and Trolley Lines

We shall be pleased to furnish designs and estimates upon request.

The Canadian Bridge Co., Limited

Walkerville, Ontario, Canada

Structural Steel of all Kinds

Montreal Office in New Birks Building.

The Cleveland Fare Box

There are 8 different Models of Fare Boxes, which cover the fare collection field from the smallest to the largest car, accommodating any rate of cash fare, and any kind of ticket.

Write us for explanation

CANADIAN CLEVELAND FARE BOX COMPANY Limited

PRESTON ONTARIO

Looking Ahead

Owing to the increased volume of business we have secured larger premises at

29 Duke Street, Toronto

On and after October 15th, 1922, we will be in a position to meet your demands for High Grade Radio Parts.

Tomlinson & Forbes

216 Victoria St., Toronto

"Water is cheaper than accidents."
No 7
W
CANADIAN WESTINGHOUSE

"Why the comparison, Sam?"

"Just this, Chief. Doc has been reporting several minor accidents recently. I put the Foot-Candle Meter to work and found the lighting was none too good. I complained to the Westinghouse Engineer who planned our lighting installation."

"Suppose you use a little soap and water, he said."

"I did—and now see the improvement."

"But what of this extra maintenance cost, Sam?"

"Negligible, Chief, when you consider the loss in production due to accidents to even one or two good men."

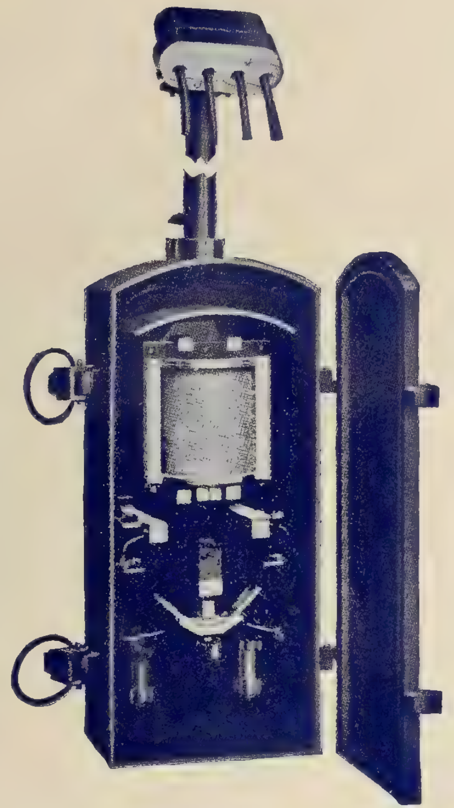
Canadian Westinghouse Co., Limited. Hamilton, Ont.

TORONTO, Bank of Hamilton Bldg.
HALIFAX, 105 Hollis St.
CALGARY, Canada Life Bldg.
MONTREAL, 285 Beave. Hall Hill
FT. WILLIAM, Cuthbertson Block
VANCOUVER, Bank of Nova Scotia Bldg.
OTTAWA, Ahearn & Soper, Ltd.
WINNIPEG, 158 Portage Ave. E.
EDMONTON, 211 McLeod Bldg.

REPAIR SHOPS:

MONTREAL—113 Dagenais St.
TORONTO—366 Adelaide St. W.
VANCOUVER
1090 Mainland St.
WINNIPEG—158 Portage Ave. E.
CALGARY—316 3rd. Ave. E.

Westinghouse



Cap. 30 Amp

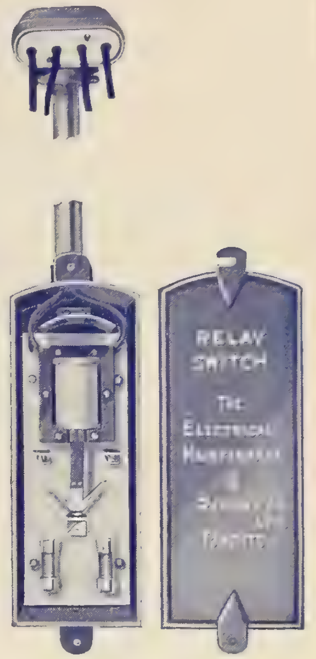
Engineers, Take Notice!

A new, smaller, simplified Remote Control Switch.

A young friend of our 30 Amp Switch—to do the many small jobs where the big fellow is too expensive.

Cheaper, yet perfectly dependable. Has been tested equal to five years' service.

For Street Lighting Control. Write about this.



Cap. 15 Amp

The Electrical Maintenance & Repairs
Company, Limited
162 Adelaide Street West **Toronto**

XCELADUCT

GALVANIZED

Approved by the Hydro-Electric Commission of Ontario
Labelled under supervision of Underwriters' Laboratories

Made in Canada Conduit

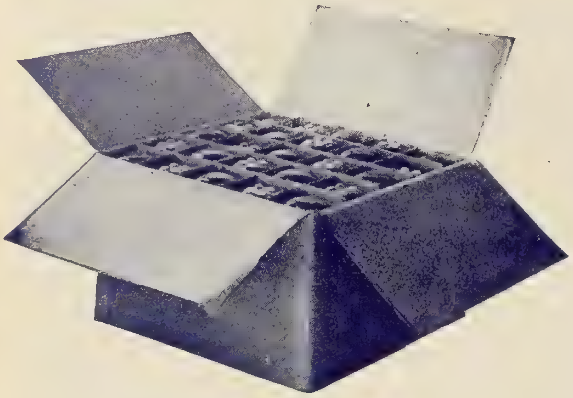
Electrical Wiring Made Safe

For All Electrical Installations

Manufactured by
National Conduit Co., Limited
Toronto

Sales Agents for Manitoba and Saskatchewan—Filer-Smith Machinery Co., Limited, Winnipeg.

White's Porcelain Strain Insulators



STANDARD CARTON

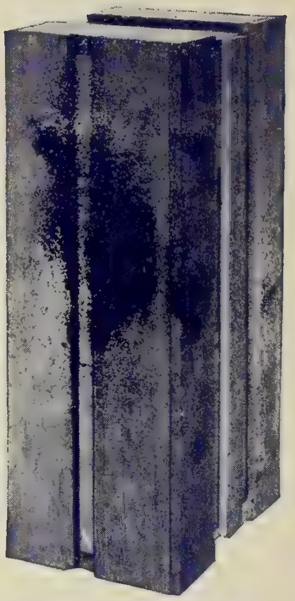
We are now packing our insulators in cartons.

No mussy sawdust.

No breaking.

Easily counted.

Easier handled and stocked.



STANDARD PACKAGE

Try some of our insulators—They all have a very uniform brown glaze, a very distinctive color, no black spots or discoloration.

T. C. WHITE ELECTRICAL SUPPLY COMPANY

1122 PINE STREET, ST. LOUIS, MO.

The New National ELECTRIC HEATRAY

The Element has an Edison Base and fits like a lamp.

Solid Steel Terminal Connections.

Separate Cord and Plug.

The **Heatray** is the most beautiful portable Heater on the market.

Be prepared to cash in on the demand.

The National Electric Heating Co. Limited, Toronto, Canada

Sales Offices: MONTREAL, WINNIPEG, VANCOUVER

Vol. XXXI No. 21 Toronto, November 1, 1922

Electrical News

Engineering
Contracting
Merchandising
Transportation

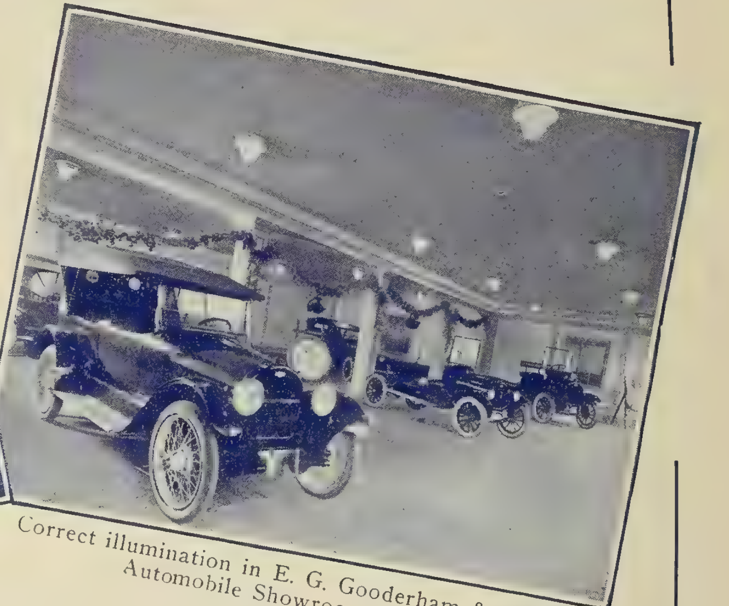
FERRANTI METER AND TRANSFORMER MANUFACTURING COMPANY LIMITED

FERRANTI — FIRST AND FOREMOST — FERRANTI

Alphabetical Index to Advertisers, Page 10 Classified Directory to Advertisements, Page 68

For Better Illumination

Correct illumination in one of the Dominion Rubber System's Workrooms.



Correct illumination in E. G. Gooderham & Company's Automobile Showrooms, Toronto.

These Installations solved two problems of Correct Lighting

Your territory teems with unsolved lighting problems. Many factories, offices, stores, hotels, churches, theatres and other public buildings are poorly illuminated. New buildings are constantly being erected. Every lighting prospect has its own peculiarities, to meet which a variety of fixtures are designed. It becomes a question of correct application. Let our illumination specialists assist you in deciding the form of lighting best adapted to your clients' needs.

Write our nearest house

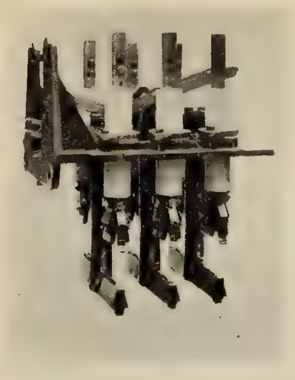
Northern Electric Company
LIMITED

MONTREAL TORONTO WINDSOR CALGARY
HALIFAX HAMILTON WINNIPEG EDMONTON
QUEBEC LONDON REGINA VANCOUVER

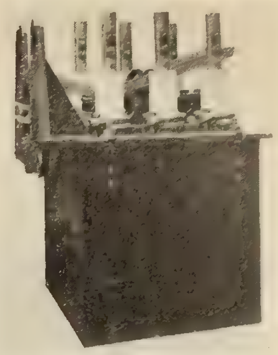
"Makers of the Nation's Telephones"

MANUFACTURING
- Manual Telephones
- Automatic Telephones
- Wires & Cables
- Fire Alarm Systems
- Radio Sending and receiving Equipment

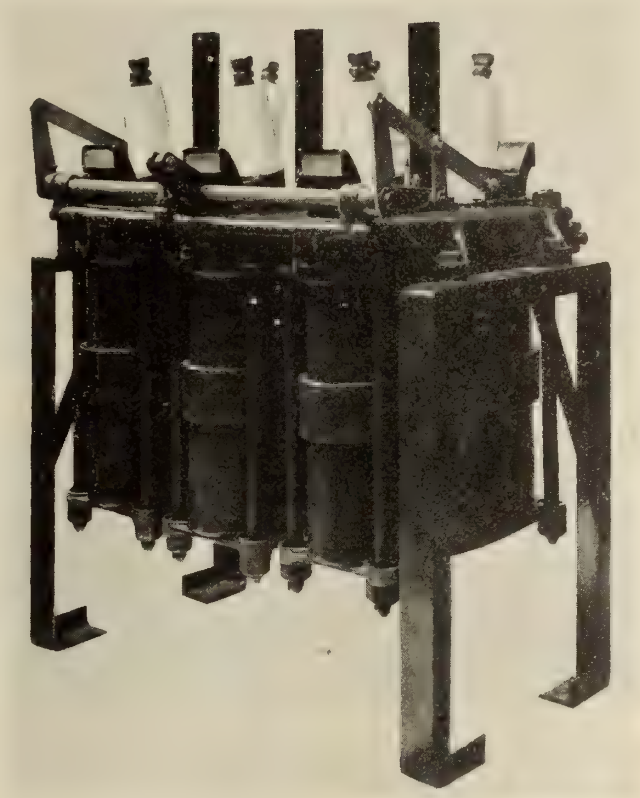
DISTRIBUTING
- Construction Material
- Illuminating Material
- Power Apparatus
- Household Appliances
- Electrical Supplies
- Power & Light Plants
- Marine Fittings



Standard Small Capacity Circuit Breaker, Tank Removed



Standard Small Capacity Circuit Breaker, Tank in Position



One of an order of nineteen switches now being supplied to the Hydro-Electric Power Commission of Ont. Rating 600 and 900 amps 15,000 V.

WE MANUFACTURE

OIL CIRCUIT BREAKERS

All Voltages and Capacities for Indoor and Outdoor Service, Also Switchboards and Switchboard Accessories

We Solicit Your Enquiries

FERGUSON, PAILIN LIMITED —OF— ENGLAND

Manufacturing Electric and General Engineers

Head Office and Works:
Higher Openshaw, Manchester

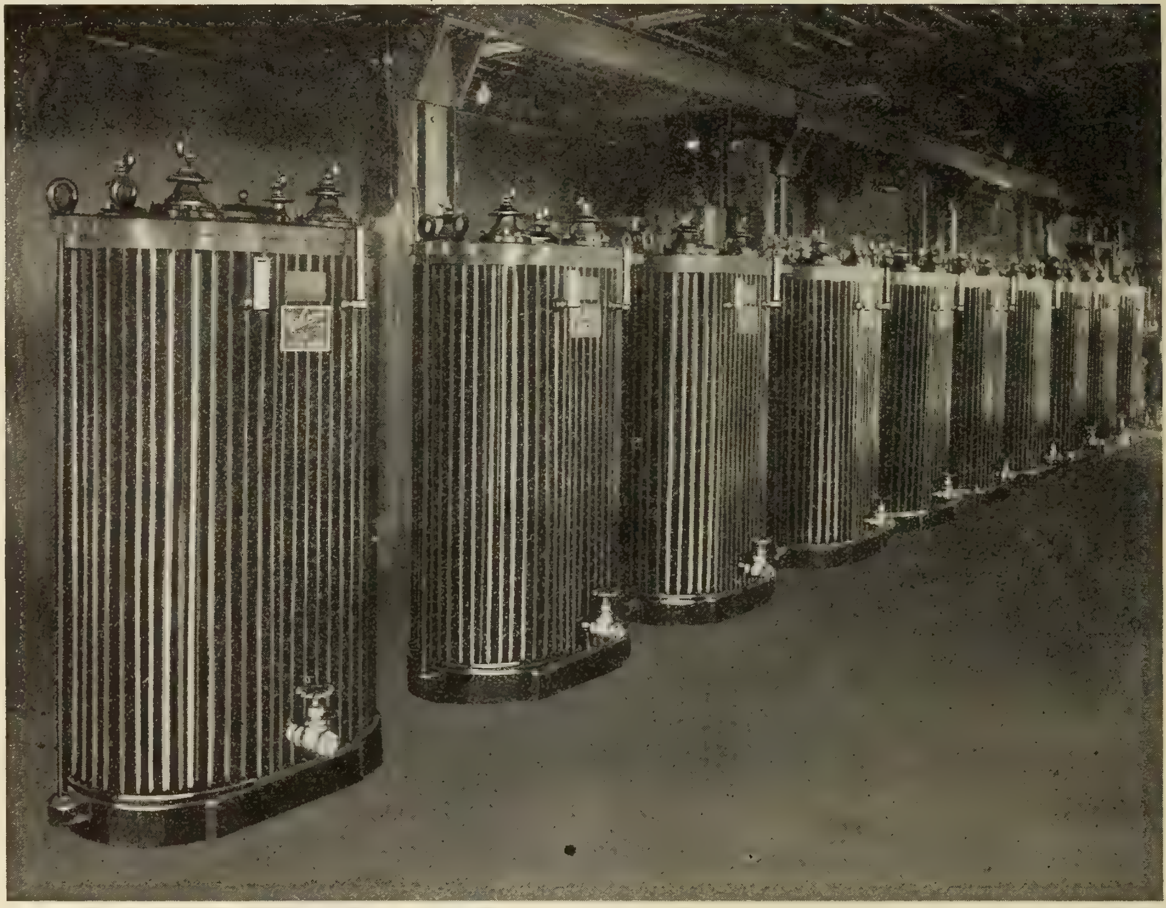
London Office:
37 Norfolk St., Strand, W.C. 2

Canadian Office and Warehouse - 321 King Street East, Toronto

HERMAN K. ANSINGH, Canadian Representative—Formerly Design Engineer with the Westinghouse Electric and Manufacturing Co., Pittsburgh, Pa.

Packard

TRANSFORMERS



A Bank of Transformers ready for shipment to the Queenston Generating Station of THE HYDRO ELECTRIC POWER COMMISSION OF ONTARIO where appearance as well as quality is essential.

Get in touch with our nearest agent now.

Others may follow, but we lead

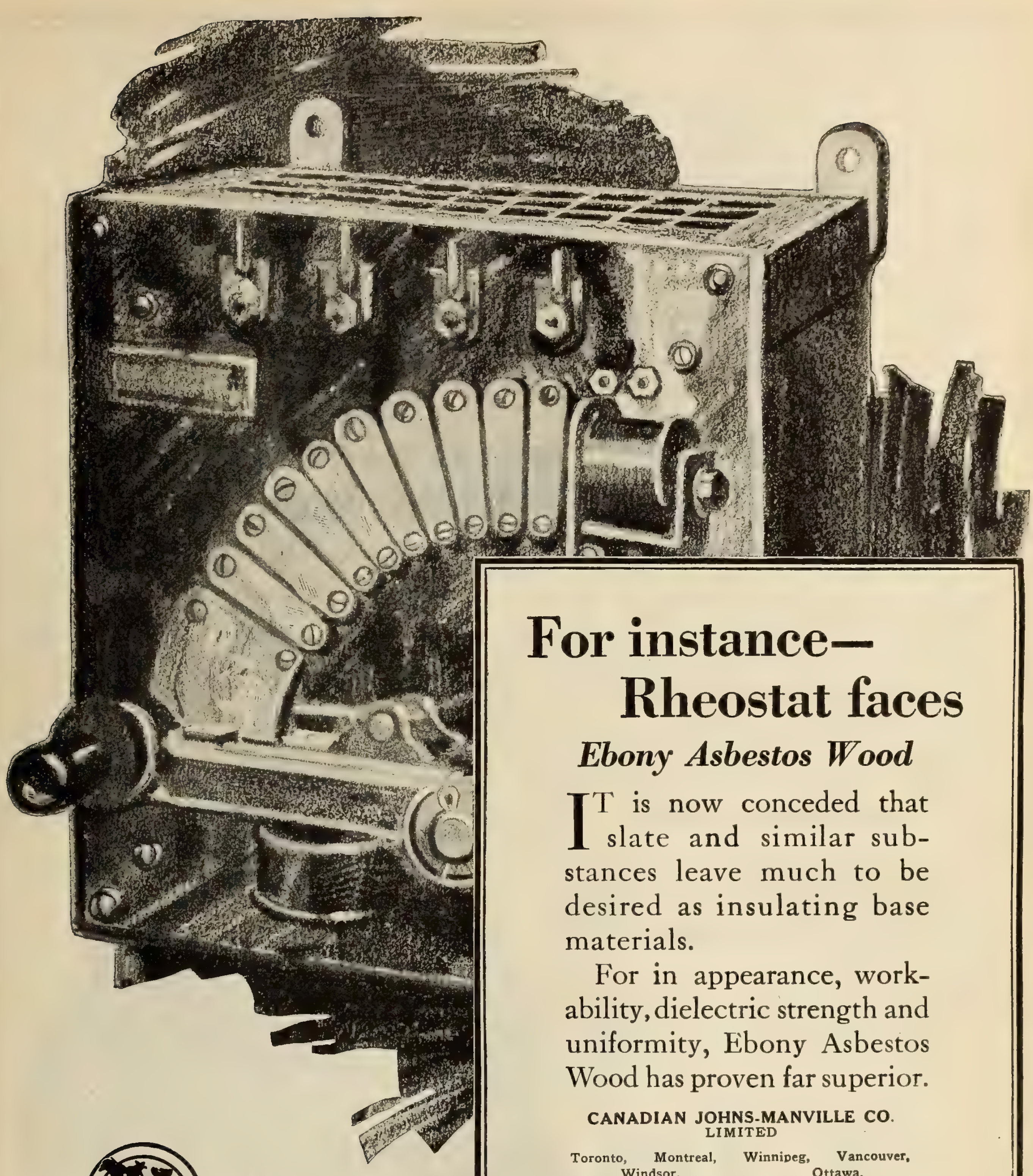
The Packard Electric Co., Limited

St. Catharines, Ontario

Room 308-9, 7 Adelaide St. W., Toronto
421 Power Building, Montreal
703 Confederation Life Building, Winnipeg

Agents:

Eastern Electric Co., Limited, St. John, N.B.
J. T. Warren, 738-11th St. West, Calgary, Alta.
W H. Hazlitt & Co., Ltd., Room 401 Northwest Bldg., Vancouver, B. C.
John Starr, Son & Co., Limited, Halifax, N.S.



For instance— Rheostat faces

Ebony Asbestos Wood

IT is now conceded that slate and similar substances leave much to be desired as insulating base materials.

For in appearance, workability, dielectric strength and uniformity, Ebony Asbestos Wood has proven far superior.

CANADIAN JOHNS-MANVILLE CO.
LIMITED

Toronto, Montreal, Winnipeg, Vancouver,
Windsor, Ottawa,

JOHNS-MANVILLE SERVICE
COVERS THE CONTINENT

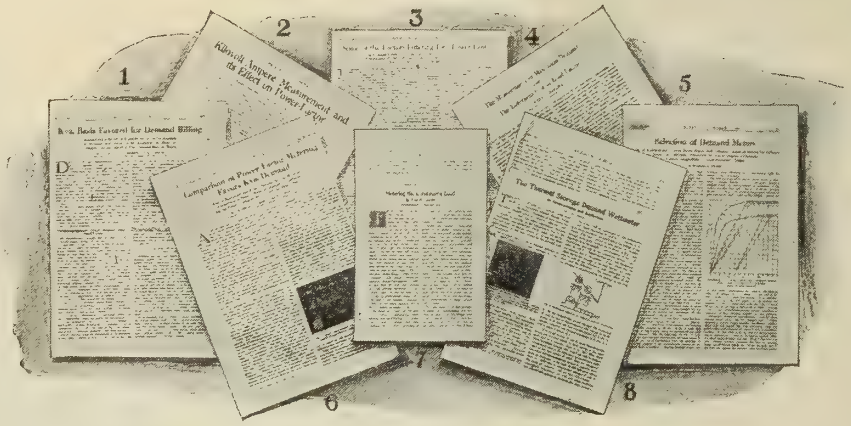
Through—
Electrical Materials
FOR
Utilities
Jobber
Contractor
AND
Dealer

JOHNS-MANVILLE

Ebony Asbestos Wood

A few of the articles on demand and power factor measurement appearing in—

1—Electrical World
2—Electrical News
3—Canadian Machinery



4—Journal American Institute Electrical Engineers
5—Electrical World
6—Electrical World
7—Example of literature now being published
8—Electrical Journal

Demand Measurement—Today's Most Widely Discussed Electrical Subject

THE subject of demand measurement and the consideration of power factor is today's most widely discussed electrical subject. Leading electrical papers of this country and of the States are publishing article after article on each and every development. Everyone connected with the electrical industry realizes that demand measurement and power factor recognition is the solution of the age-old problem of rate making.

The Lincoln Maximum Demand Meter is the acknowledged leader in this electrical advance. It accurately measures demand and supplements the energy reading of the watt hour meter. It gives the true thermal average of demand and does not split peaks. It measures either to a watt, or to a volt ampere basis thereby considering power factor. It enables the central station manager to bill on 100% MEASURED BASIS, and insures the entire satisfaction of all parties concerned.

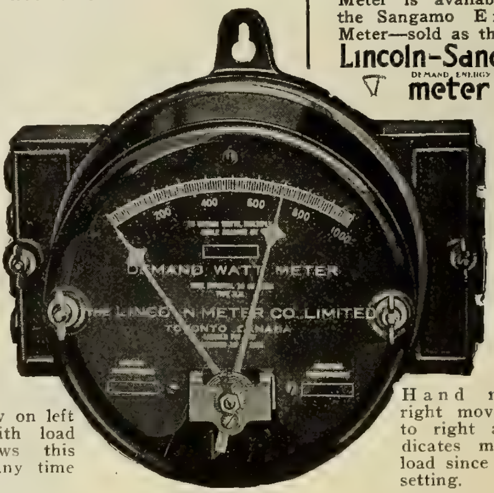
It is economical in price and economical to install. It is significant that this thoroughbred Canadian product is the leader in today's leading electrical development.

Write for catalog and quotations.

Write for the section or (sections) of the Lincoln Meter catalog which interests you. SECTION I is a non-technical treatise on why demand should be measured; SECTION II, the technical treatise on demand measurement; SECTION III, Installation; SECTION IV, the Lincoln Graphic Demand Meter; SECTION V, the Lincoln method of Volt-Ampere Demand Measurement (Power Factor recognition); and Section VI, the Lincoln Split Core Transformer and Demand Ammeter.

The Lincoln Demand Meter is available with the Sangamo Energy Meter—sold as the **Lincoln-Sangamo** DEMAND ENERGY **meter**

The Lincoln Meter Co., Limited
243 College Street, Toronto, Canada
Cable "Meters" Toronto. Phone College 1374



Hand now on left varies with load and shows this load at any time of day.

Hand now on right moves only to right and indicates maximum load since last resetting.

Lincoln MAXIMUM DEMAND meter

FISH PAPER

Where high dielectric strength is demanded in thin insulation there is no similiar material comparable to Diamond Insulation. These and other qualities make it ideal for use on armatures and field coils.

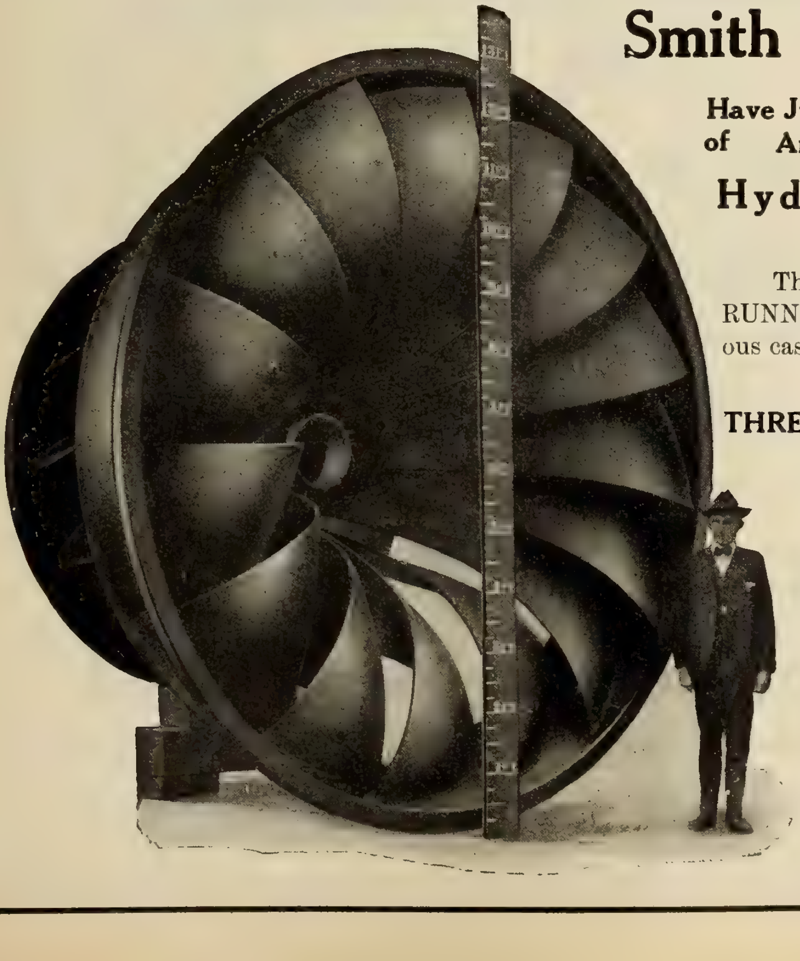
Diamond Insulation is very flexible and may be easily bent and formed without danger of cracking. Its superiority is also found in its ability to withstand extreme pressure.. Samples for testing will gladly be supplied on request.

"Condensite Celoron" (Hard Waterproof Fibre) is the most adaptable of all insulating materials and is used for waterproof insulation and silent waterproof gears.

Diamond Fibre, used for general insulating purposes, comes in sheets, rods and tubes for your own machining. Ask us for prices and particulars.

Diamond-F

Diamond State Fibre Company
of Canada Limited
Head Office and Works: 235 Carlaw Ave., Toronto, Can.



Smith Hydraulic Turbines

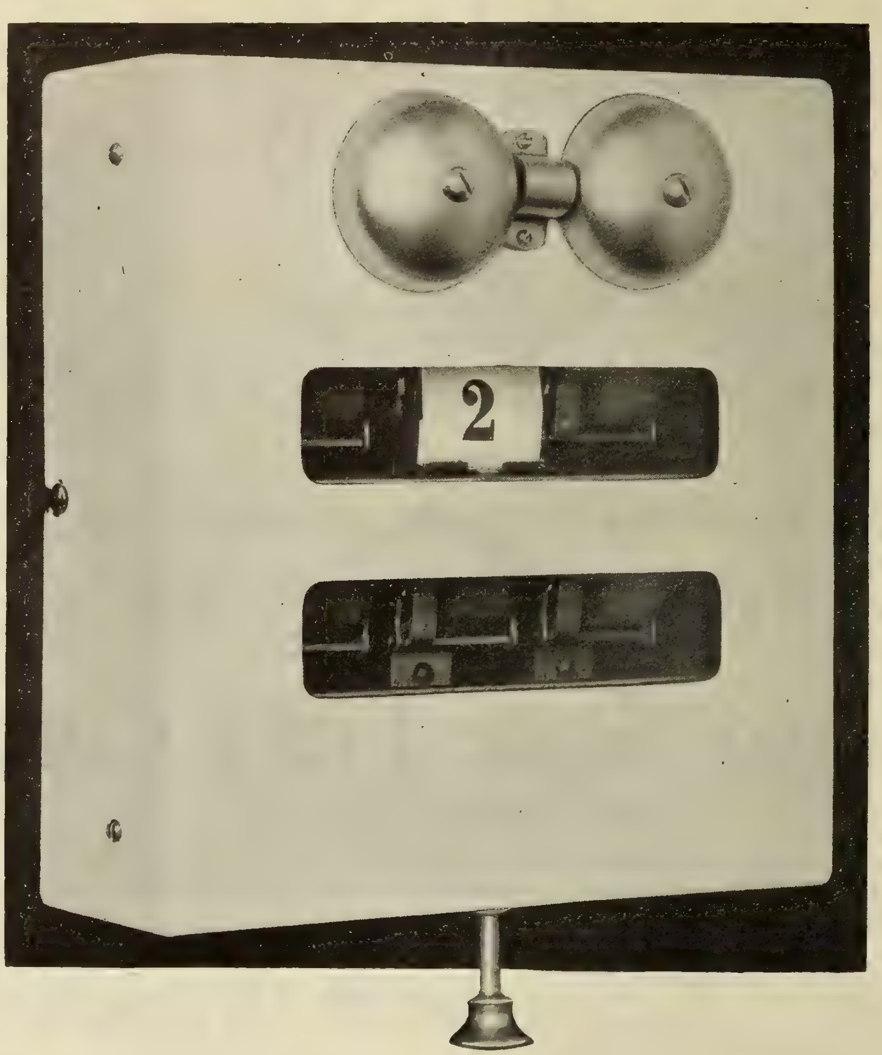
Have Justified Their Installation in many of America's Biggest and Best Hydro Electric Developments

The accompanying view illustrates a SMITH RUNNER, 13 feet diameter, made in one continuous casting by means of dry sand cores.

THREE TURBINE UNITS (of which these runners comprise the rotating element) furnished for installation in the Yadkin Falls, N. C., plant of the Aluminum Co. of America. Each unit develops 10,000 H.P. at 90 R.P.M. under 48 feet head, using water at 92 per cent efficiency.

Write Dept. "N" for Bulletin.

S. MORGAN SMITH CO.
YORK, Pa., U.S.A.
H. B. VANEVERY, Representative
405 Power Building Montreal



Edwards No. 91 Annunciator

The "San-Fer-Ann" Annunciator illustrated above is the last word in a high class, moderate cost instrument. With its white enamelled, formed steel case and nickel-plated trimmings, it is unusually attractive and harmonizes beautifully with the kitchen trimmings in the modern home. Any discoloration may be instantly removed with a damp cloth.

The drop openings are fitted with glass and the case is secured to the backboard with substantial hinges on one side and locks on other side with screws which fit into keyed slots. This is a new and very secure form of fastening.

The bell is specially designed for annunciator service. It has double magnets, armature supported on heavy pivots, widely spaced, broad pure silver contact points with locking adjustment.

If your Jobber can't supply your needs
we can ship from Montreal stock

G. L. MacGillivray & Company Limited

3 St. Nicholas Street, Montreal

Agents for Western Canada
Cochrane-Stephenson & Co., Limited,
Winnipeg, Man.

Ontario Representative
A. R. Wooldridge,
220 King St., West, Toronto

"Reel Service"

From Coast to Coast

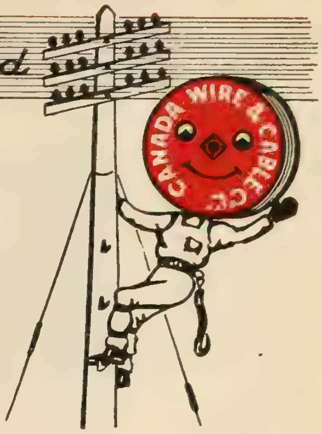
Canada Wire & Cable Co. Limited

Halifax Montreal Toronto Regina
Winnipeg Calgary Vancouver

MANUFACTURERS OF
Copper
Bare, Weatherproof, Rubber Covered

Electrical Wires and Cables

and STEEL WIRE ROPE


CANADA WIRE & CABLE CO.

I-T-E
CIRCUIT BREAKERS
The Standard for
SAFETY
ELIMINATE ALL
FUSE TROUBLES

CIRCUIT I-T-E BREAKERS

THE
CUTTER
COMPANY
PHILADELPHIA

24 Adelaide St., East
TORONTO

LONG DISTANCE

transmission lines with steel re-inforced

ALUMINIUM

conductors mean—

Lower Cost per mile
Longer Spans
Fewer Insulation Losses
Reduced Corona Losses

The British Aluminium Co., Ltd.
of London, England

Canadian Office:
592 King St. W.
Toronto

Eastern Agents:
Spielman Agencies
Montreal

AICO

COLD MOLDED INSULATION
BAKELITE - CONDENSITE - ROXITE
SHELLAC COMPOSITIONS

We have a capable engineering force ready to take up your molded insulation problems.

Suggestions and estimates cheerfully given without obligation.

AMERICAN INSULATOR CORPORATION
52 Vanderbilt Ave., New York, N.Y.
Represented in Canada by
G. L. MacGILLIVRAY & CO., LIMITED
3 St. Nicholas St., Montreal, P.Q.

We specialize
in the manufacture of

BRUSHES

For ALL TYPES of
Motors and Generators

Orders shipped promptly

DOMINION CARBON BRUSH CO.
38 Duke St., TORONTO
E. W. Playford, 358 Beaver Hall Sq., Montreal

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Canada Wire & Cable Co.	9
Canadian Armature Works	31
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Canadian-Cleveland Fare Box Co.	
Canadian Drill & Electric Box Co.	
Canadian Floor Waxer and Polisher Co. Ltd.	
Canadian General Electric Co.	19-20-21-22
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Rubber Covered Wires and Cables
FOR POWER, LIGHT AND TELEPHONE WORK
Incandescent Lamp Cord, Flexible Switchboard Cables, Special Cords and Cables for all kinds of Electrical Work.
Prompt Shipments from Canadian Factory.
BOSTON INSULATED WIRE & CABLE CO., Limited
Canadian Office and Factory, HAMILTON, ONT.

GALVADUCT

The Canada Cement Building, Montreal. Barott & Blackader, Architects.

"GALVADUCT"

The most perfect interior construction conduit on the market. Recognized as the standard of high quality.

Always specify Galvaduct or Loricated CONDUITS.

"LORICATED"

A high class interior construction conduit of the enamelled type, proof against acid or other corrosive agents.

If your jobber cannot supply you —write us.

LORICATED

CONDUITS COMPANY LIMITED

TORONTO MONTREAL
Western Sales Office: 602 Avenue Building, Winnipeg

"Northern"

The Better Heating Pad

Three heats

Cutler-Hammer Switch

Size 12″x15″

Extra heavy eider-down cover

Washable Slip

The **"Northern"** Pad embodies the very best materials and the highest type of construction.

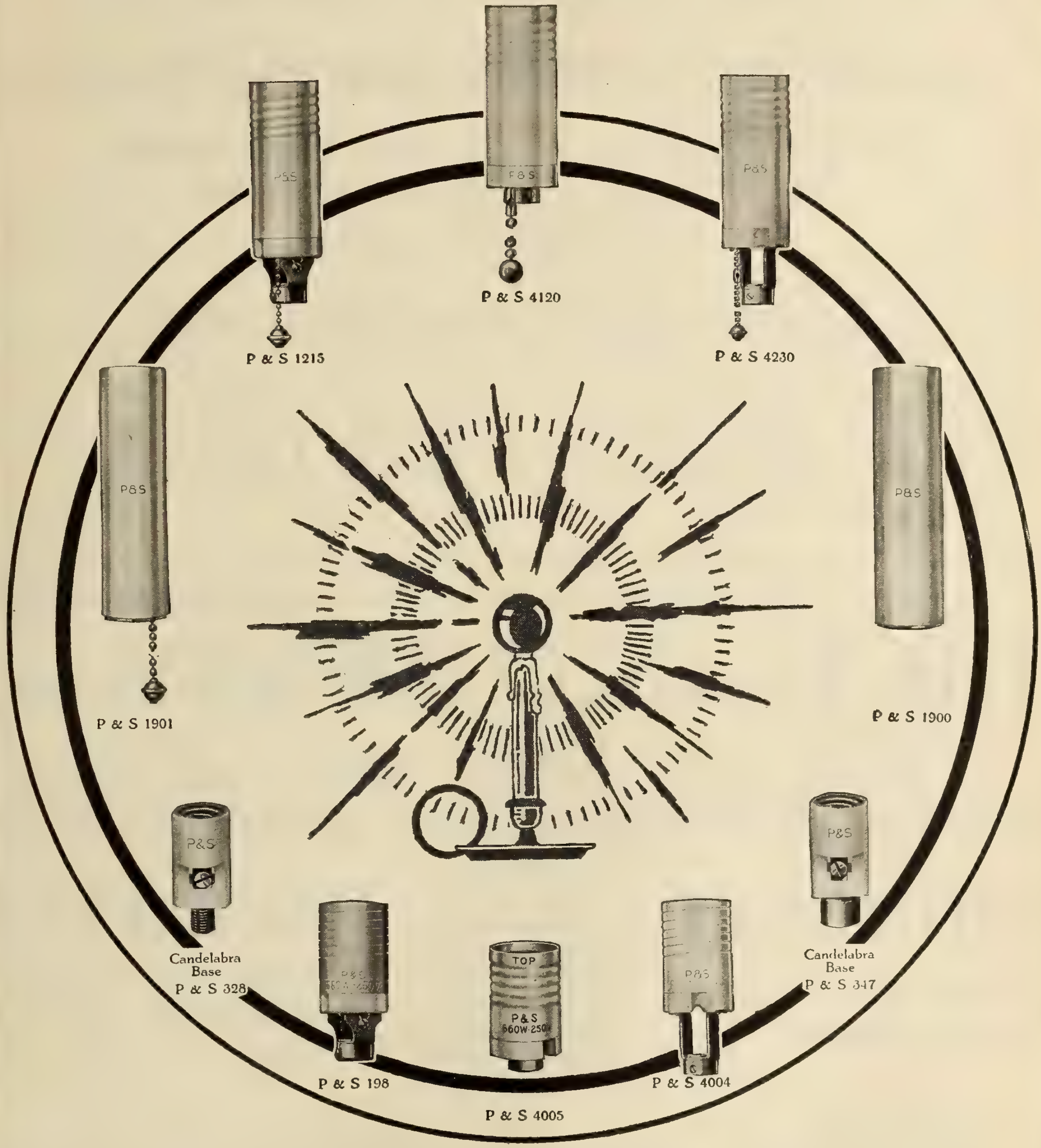
Place your order for fall selling now. Heating Pad business will be brisk. **"Northern"** Heating Pads are dependable—they are made to last and give satisfaction. **"Northern"** dependable heating pads build business for the dealer through their outstanding quality and reliability and at the same time afford the dealer a handsome profit on each sale.

For Sale Throughout Canada by

Northern Electric Company
LIMITED

Montreal Toronto Hamilton Windsor Regina Edmonton
Halifax Quebec London Ottawa Winnipeg Calgary Vancouver

CANDLE SOCKETS



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SOLVAY, NEW YORK

NEW YORK BOSTON PHILADELPHIA SAN FRANCISCO CHICAGO

"Banfield" Wiring Devices

Have you received our Catalogue No. 6,
showing our complete line of wiring devices?

SEASONABLE DEVICES FOR FALL TRADE

Flush Push Switches **Flush Toggle Switches**
Snap Switches **Levolier Pull Sockets**

Stocked by Representative Jobbers

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MANUFACTURERS OF FLEXIBLE CONDUIT AND KRAFT PAPER CORD

LOOMDUCT

A Single Wall Conduit of Unusual Flexibility.

Every coil of "Loomduct" and "Insuladuct" is fished at the factory and guaranteed against defects of every kind.

INSULADUCT

A Double Wall Conduit of Great Strength and Durability.

TRADE MARK Loomduct REGISTERED

APPROVED BY THE
BOARD OF FIRE
UNDERWRITERS : :

TRADE MARK Insuladuct REGISTERED

THE FOLLOWING SIZES ALWAYS IN STOCK:— ¼" ⅜" ½" ⅝" ¾" 1"

Don't Miss the Convention

Ontario Electrical Contractors and Dealers

The Place— TORONTO
The Dates— NOVEMBER 13th and 14th
Headquarters— KING EDWARD HOTEL

Drop Business
Drop Everything

Come to the Convention

You will get information
You will impart information
You will meet your old friends
You will make new ones

Canadian Westinghouse Co., Limited, Hamilton, Ont.

TORONTO, Bank of Hamilton Bldg.
HALIFAX, 105 Hollis St.
CALGARY, Canada Life Bldg.
MONTREAL, 285 Beaver Hall Hill
FT. WILLIAM, Cuthertson Block
VANCOUVER, Bank of Nova Scotia Bldg.
OTTAWA, Ahearn & Soper, Ltd.
WINNIPEG, 158 Portage Ave., E.
EDMONTON, 211 McLeod Bldg.

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MONTREAL—113 Dagenais St.
TORONTO—366 Adelaide St. W.
VANCOUVER
1090 Mainland St.
WINNIPEG—158 Portage Ave. E.
CALGARY—316 3rd. Ave. E.

Get the Habit

Order
by the name

"TRICABLE"

THE

MADE IN CANADA
Armoured Conductor

All sizes up to 3-conductor No. 4
—Carried in stock—

Selling Agents

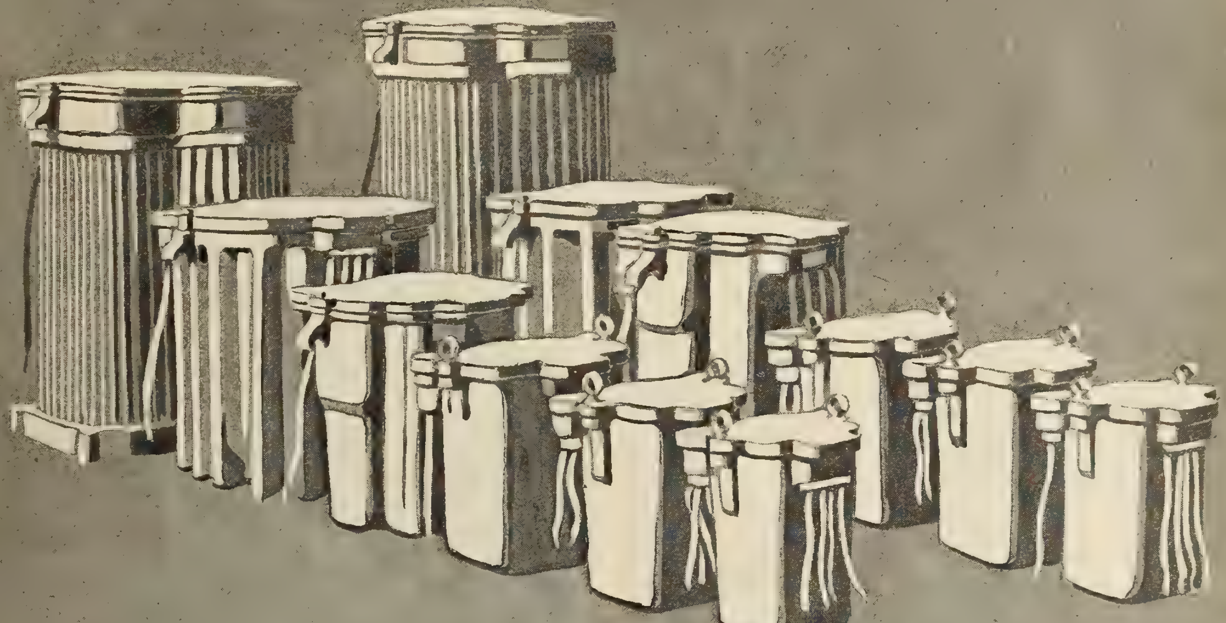
Conduits Company Limited
33 Labatt Avenue TORONTO

Western Agents

Cochrane-Stephenson Company
Winnipeg Vancouver

Wagner, Quality

40° MOTORS AND "BLUEBLOOD" TRANSFORMERS



TESTS ❧ ❧ In Wagner transformers wound for a ratio of 2300 to 230/115 volts, the high voltage windings are tested with 10,000 volts; the low voltage windings with 5,000 volts. ¶The turn insulation is tested by applying double voltage to one winding with the others open circuited. All of these tests are applied for one minute without oil in the case. Transformers built for higher voltages are given correspondingly higher voltage tests.

Wagner,Quality

Wagner,Quality Transformers are furnished in both Distribution and Power Types in a wide range of styles and sizes

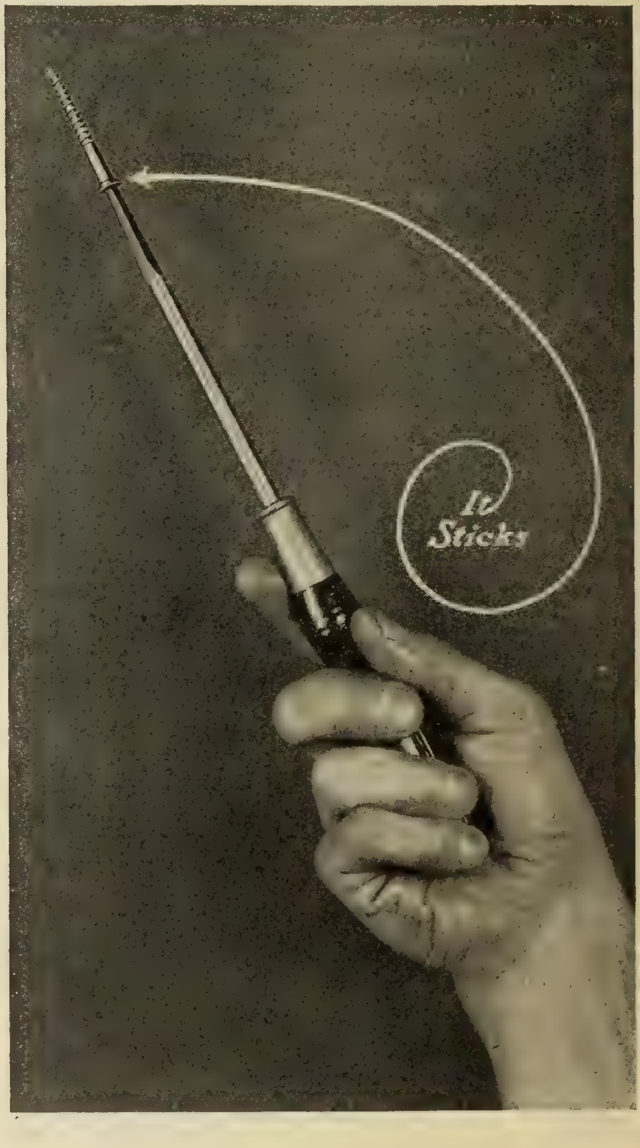
Wagner Electric Manufacturing Company
of Canada Limited
Power Building, Montreal **217 Dundas St., East, Toronto**

2623

Bigger Profits when you use Robertson Socket Head Screws

Here's the reason

A man can drive 2, 3 and even 4 socket head screws while he is fumbling around with one of the old style slot-screws. That means time saved—and time is money to the busy electrical contractor. Further, there are no lost screws, because they cannot fall off the driver. As one user writes, "I have just finished driving twenty gross without losing a single screw."



To Manufacturers

During the manufacturing or the assembling of manufactured parts where the work is confined to the driving of screws, speed is the big factor.

We can show you how this work can be done in half the time. Drop us a line for full details today.

P. L. Robertson Mfg. Co. Limited

Milton, Ontario

Are You Interested in Doing More Business Next Year?

Would you like to obtain real merchandising ideas from men who have actually put their ideas into force, men of the electrical industry who are anxious and willing to help you? If you would, then

King Edward Hotel, Toronto, where the Convention will be held

Come to the Convention at Toronto Nov. 13th & 14th

The Convention of the Ontario Association of Electrical Contractors and Dealers, which will be held at the King Edward Hotel, Nov. 13th and 14th, is going to be the biggest and best Electrical Convention ever held in Canada. Can you afford to miss it? Not if you want

First Hand Knowledge of How Other Contractor-Dealers Are Making A Success of Their Businesses

The important thing now is to arrange your programme, so that you will be in Toronto, Nov. 13th and 14th. You will find these two days the best investment in your own business that you have made this year.

Canadian General Electric Co., Limited

HEAD OFFICE TORONTO

Branch Offices: Halifax, Sydney, St. John, Montreal, Quebec, Cobalt, Ottawa, Hamilton, London, Windsor, South Porcupine, Winnipeg, Calgary, Edmonton, Vancouver, Nelson and Victoria.

Hotpoint

Safeguard Yourself by Placing Your Christmas Order Now

Every Christmas a large number of dealers run short of Hotpoint appliances at just the very time they need a representative stock most. This is unfortunate, as there is absolutely no danger of dealers finding themselves burdened with slow moving merchandise after the Christmas season is over, because Hotpoint devices always have a ready sale.

Catalogue No. T10
Hotpoint Reversible Toaster

Probably few electrical appliances have such a large potential market as the Toaster. Everybody likes toast, and if once shown the advantage of making it the Hotpoint Way will as a rule purchase a toaster. The Hotpoint Reversible Toaster is having a very large sale, simply because of its efficiency, attractive appearance, and reasonable price.

Catalogue No. S12
Hotpoint Boudoir Set

The Boudoir Set consists of a three pound Hotpoint Iron, and nickel plated stand for converting the iron into a small stove, and a pair of folding curling tongs. The iron is equipped with spaces for inserting and heating the curling tongs. The outfit is enclosed in an attractive leather bag.

Catalogue No. G4
Hotpoint Radiant Grill

Boils, broils, fries and toasts, any two operations at the same time, one above and the other below the coils. Equipped with simple three heat adjustment. Food may be started on "high" and finished on either "medium" or "low." Equipped with two aluminum rust-proof dishes, each, two and a half pints capacity and a cover to fit either dish, which can be used as a reflector or cake griddle.

"Made in Canada" by

Canadian General Electric Co., Limited

HEAD OFFICE TORONTO

Branch Offices: Halifax, Sydney, St. John, Montreal, Quebec, Cobalt, Ottawa, Hamilton, London, Windsor, South Porcupine, Winnipeg, Calgary, Edmonton, Vancouver, Nelson and Victoria.

Hotpoint

Put Hotpoint Window Displays In Early This Year

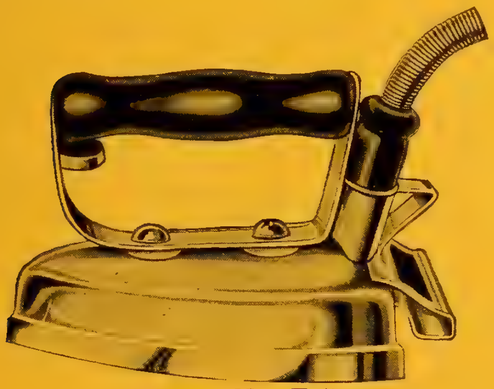
The second or third week in November is not a bit too soon to commence dressing your windows with Hotpoint Christmas suggestions.

Many people while they may delay the actual purchase of an article, make up their minds what they are going to give a considerable time before Christmas week. These are the people you need to influence the most.

Another consideration is, the fact that by using your windows early you get in ahead of your competitors, not necessarily electrical dealers, remember, every retail merchant makes a special drive for business during the Christmas season. Your object, of course, is to induce the people of your community to say "Merry Christmas Electrically." Therefore, use your show windows early.

Catalogue No. P3, 6 Cups,
Hotpoint Percolator

The illustration shows what is probably the most popular seller among the complete line of Hotpoint Percolators. It is constructed throughout of copper, finished in bright nickel and silver plated inside, with ebonized wood handle, fibre tipped feet to protect polished surfaces. The cover is hinged and fitted with Macbeth glass globe. Equipped with the famous Hotpoint percolating apparatus and safety switch.



Catalogue No. F17
Hotpoint Iron

The celebrated Hotpoint Iron is always a popular Christmas gift. Its many outstanding features have earned for it the slogan "The Standard by which all other Irons are Judged."

Make sure of having an adequate stock of "Hotpoint Servants for the Home" by placing your Christmas order now with your jobber or our nearest sales branch.

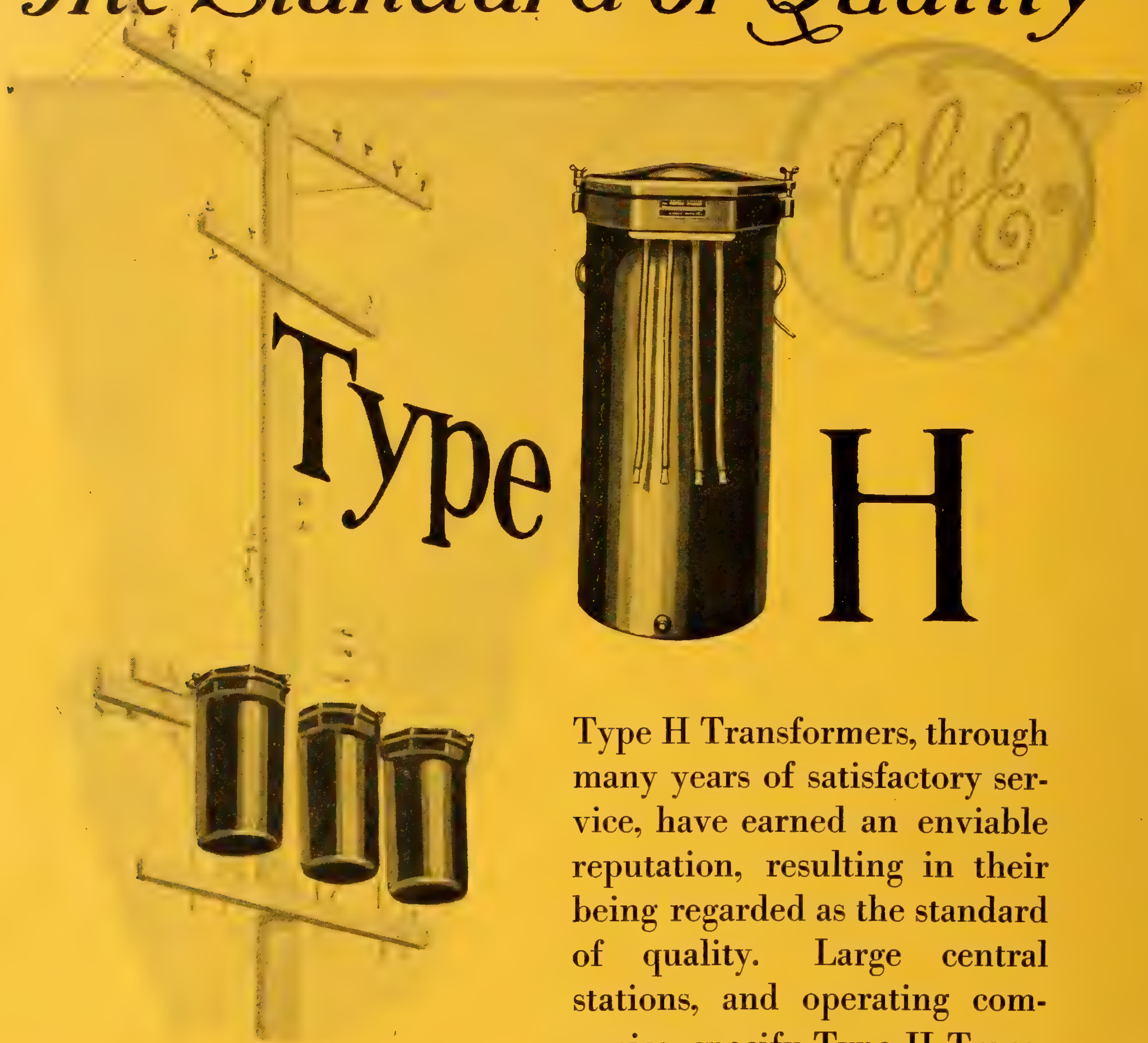
"Made in Canada" by

Canadian General Electric Co., Limited

HEAD OFFICE TORONTO

Branch Offices: Halifax, Sydney, St. John, Montreal, Quebec, Cobalt, Ottawa, Hamilton, London, Windsor, South Porcupine, Winnipeg, Calgary, Edmonton, Vancouver, Nelson and Victoria.

The Standard of Quality



Type H Transformers, through many years of satisfactory service, have earned an enviable reputation, resulting in their being regarded as the standard of quality. Large central stations, and operating companies, specify Type H Transformers because of their long life, and excellent operating characteristics. Low depreciation rates, and uninterrupted service will eventually win on any system.

"Made in Canada" by

Canadian General Electric Co., Limited

HEAD OFFICE TORONTO

Branch Offices: Halifax, Sydney, St. John, Montreal, Quebec, Cobalt, Ottawa, Hamilton, London, Windsor, South Porcupine, Winnipeg, Calgary, Edmonton, Vancouver, Nelson and Victoria.

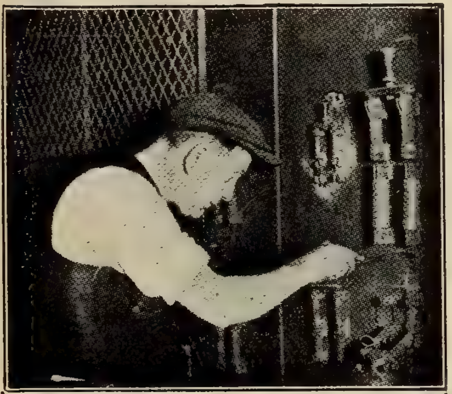
We are manufacturers, in a large way, of

TOP PINS, SIDE BRACKETS, POLE STEPS AND CROSS ARMS

We have been supplying this pole line material for years, from coast to coast, to the largest telephone, telegraph and electric lighting systems.

Our goods are specified where efficiency and economy are measured by actual results and not by purchase price only.

THE LACHUTE SHUTTLE CO., LIMITED
Lachute Mills, P. Q.



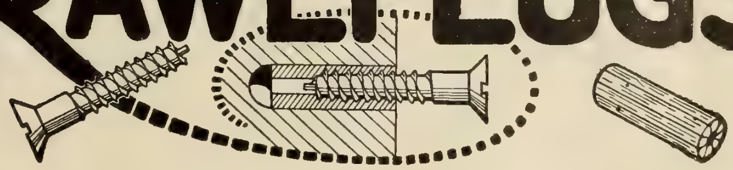
For the Electrician

The fact that Rawlplugs hold many advantages for electrical men finds appreciation in their use by the largest corporations: C.P.R., Northern Electric Co., Devoe Electric Switch Co., Monarch Electric Co., Hydro Electric Power Commission of Ontario, Toronto Hydro Electric System, and many others.

Write for samples and prices.

FIX IT WITH

RAWLPLUGS

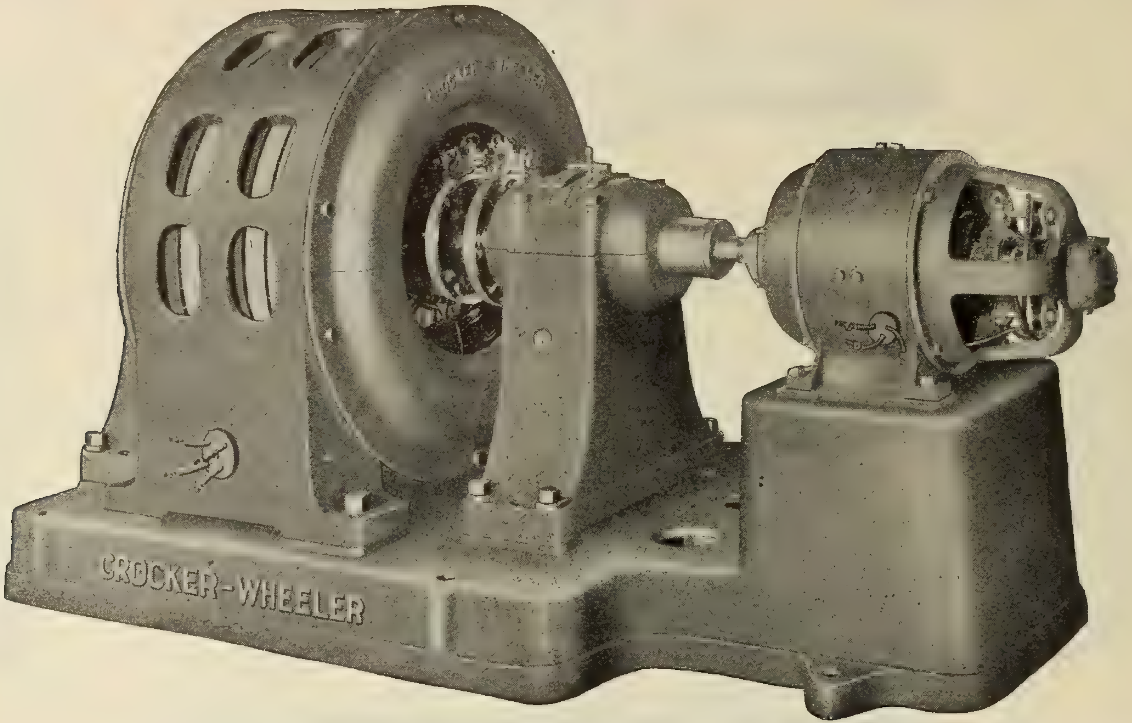


Have You Tried Them?

This simple device greatly facilitates work in electrical installations. Rawlplugs are cheaper, more efficient and require less time to use than other devices. As the screw is turned home a vice-like grip is obtained due to the expansion that takes place. The minute fibres of the plug are compressed into the interstices of the hole and the Rawlplug thereby becomes an integral part of the surrounding material.

INVENTIONS LIMITED
Sole Agents for the Rawlplug Co. of Canada
Southam Building Bleury Street Montreal

Sales Agents for Ontario: Dominion Engineering Agency, Limited, 24 Adelaide St., East, Toronto.
Sales Agents for Manitoba: Sterling Specialties, 213 Somerset Bldg., Winnipeg, Man.



300 K. V. A. 900 R.PM., 4,000 volts, 3 phase, 60 cycles, Synchronous Condenser with Direct Connected Exciter

It's called a Synchronous Condenser—

but it should be called a Dividend Saver!

"Penalties for Power Factor"—an unpleasant term and a still more unpleasant fact which central stations are bringing to your attention more and more pointedly. Avoid this avoidable money loss, via the Synchronous Condenser route, and Canadian Crocker-Wheeler engineering service. Let us show you just what considerable money we can save you.

THE CANADIAN

CROCKER-WHEELER CO.

LIMITED

Manufacturers and Electrical Engineers

Head Office and Works:
ST. CATHARINES. Ont.

District Offices:
TORONTO MONTREAL

Also all Branches of *Northern Electric Company* LIMITED
Montreal, Halifax, Ottawa,
Toronto, London, Winnipeg,
Regina, Calgary, Vancouver.

THE TEST OF TIME

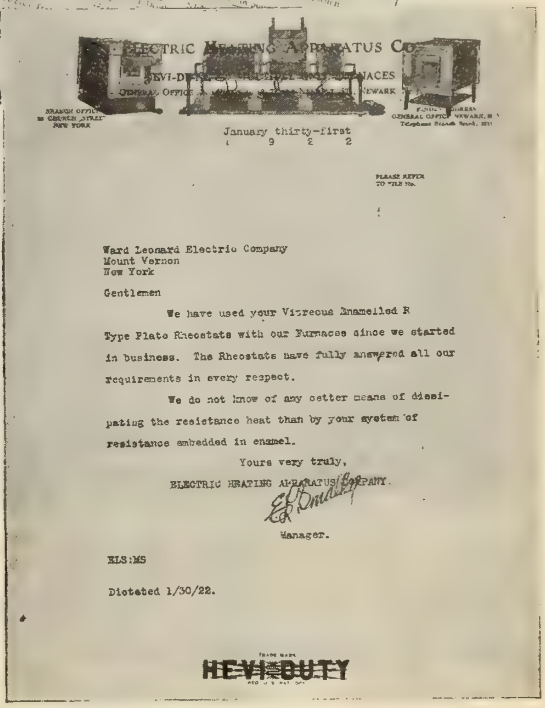
1892 1922

30

Years' Success

in the manufacture of Control Apparatus for generator motor, dynamo battery charging, telephone, telegraph, railway signal, wireless, stage and theatre lighting, motion picture and searchlight projection, heating apparatus and for any service where permanence in fixed or adjustable resistance values is required. Our 30 years' successful manufacturing experience, exclusively in this field, is valuable to every resistance user. Mr. Smalley's letter opposite, voices the value of this experience to him. We can cite numbers of similar experiences with Ward Leonard apparatus.

A few sizes of Ward Leonard Vitrohm plates are shown below. Any ampere or resistance taper required can be obtained on these plates. Tell us your requirements—surely we have a size to meet your needs.



ELECTRIC HEATING APPARATUS CO.
HEVI-DUTY ... FURNACES
GENERAL OFFICE ... NEWARK

BRANCH OFFICE
26 CHURCH STREET
NEW YORK

GENERAL OFFICE NEWARK, N.J.

January thirty-first
1 9 2 2

PLEASE REFER
TO FILE No.

Ward Leonard Electric Company
Mount Vernon
New York

Gentlemen

We have used your Vitreous Enamelled R Type Plate Rheostats with our Furnaces since we started in business. The Rheostats have fully answered all our requirements in every respect.

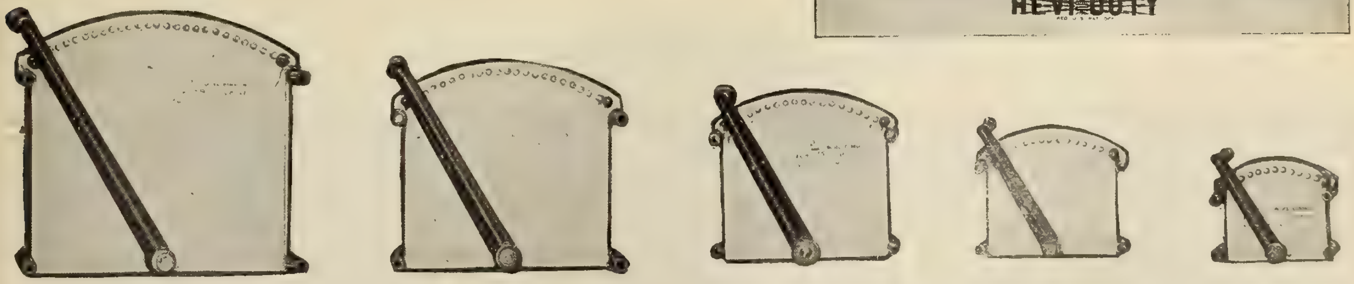
We do not know of any better means of dissipating the resistance heat than by your system of resistance embedded in enamel.

Yours very truly,
ELECTRIC HEATING APPARATUS COMPANY.
E. L. Smalley
Manager.

ELS:MS

Dictated 1/30/22.

TRADE MARK
HEVI-DUTY
REG. U.S. PAT. OFF.

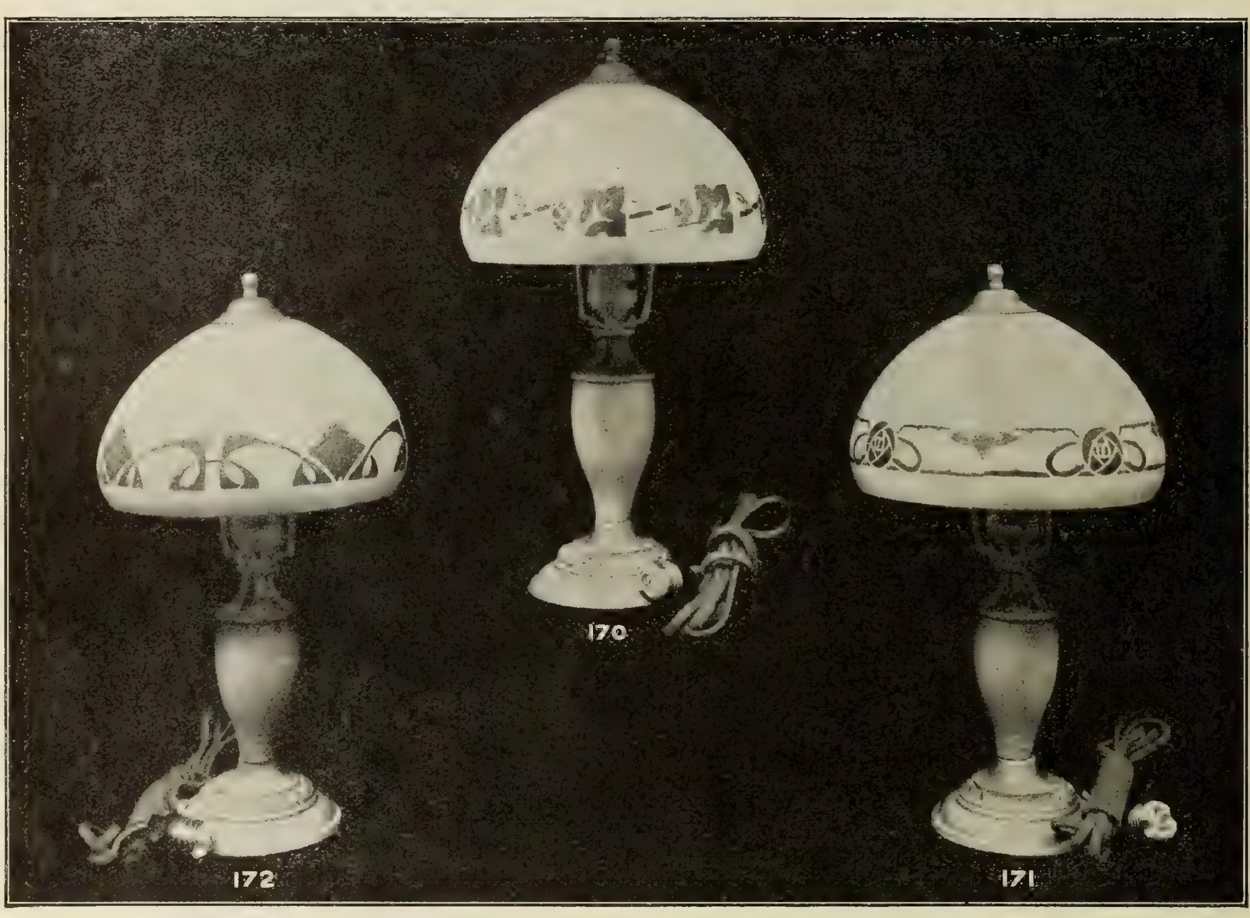


Ward Leonard Electric Company
Mount Vernon, New York

Willis D. Bishop, Montreal

XMAS SALES

INCLUDE A LARGE NUMBER OF ELECTRIC LAMPS



We have a complete line of all sizes in stock for immediate delivery. Decorations that make the most pleasing gifts. Prices from $4.20 up, for complete lamps.

Order an assortment from us now

FACTORY & HEAD OFFICE
388 CARLAW AVE
TORONTO

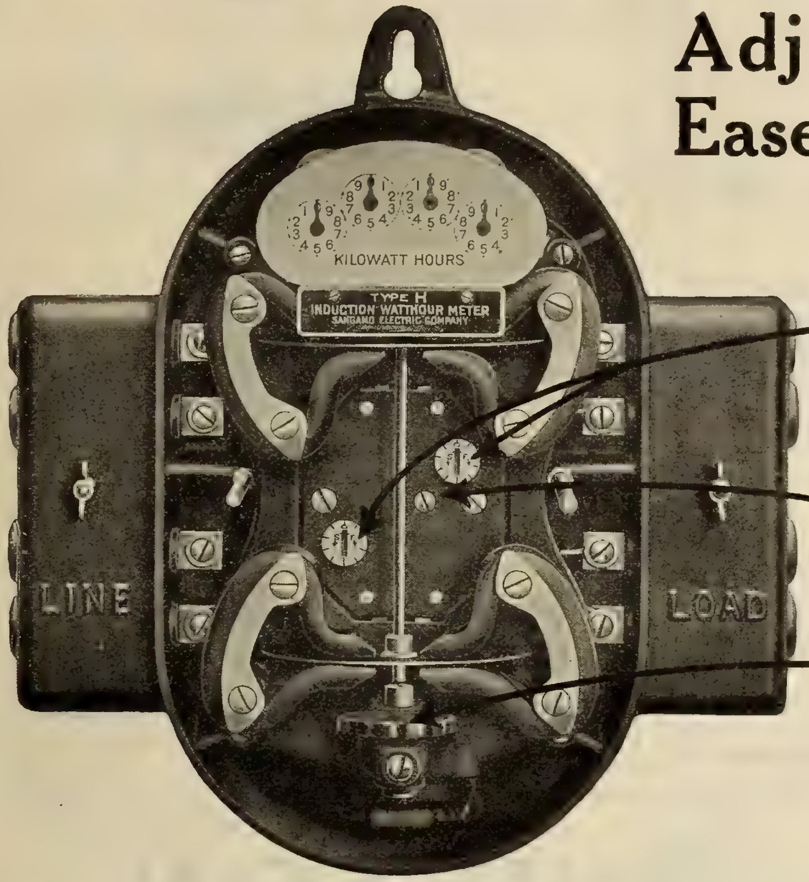
DOWN-TOWN SHOW ROOMS
164 BAY ST. TORONTO

Jefferson Glass
MADE IN CANADA
COMPANY LIMITED

285 BEAVER HALL HILL
MONTREAL
272 MAIN STREET
WINNIPEG
510 HASTINGS ST. W.
VANCOUVER

Sangamo Polyphase

Adjustment with Ease and Accuracy



THE Sangamo Way of meter adjustment on the Type "H" Watthour meter eliminates all guesswork. It provides a positive, easy and simple way of adjustment which saves time and trouble.

Light Load Adjustment—As shown in the above illustration, Light Load Adjustment is accomplished by turning the micrometer adjustment screws a fixed amount for each per cent of desired correction. One complete revolution of the micrometer screw produces an approximate change of 2½ per cent. Consequently each division represents ¼ of 1 per cent.

Torque Balancing Adjustment. There is no guesswork in balancing Sangamo meters for torque: simply buck the elements and turn the torque balancing screw until disc movement ceases.

Full Load Adjustment is accomplished by loosening the clamp screw and turning the iron disc indicated above. Turning the iron disc one way brings it closer to the magnets thereby speeding up the meter. Turning it the other way removes the iron disc a greater distance from the magnets and slows up the meter. When adjustment is made the clamp screw locks it in position. **All accomplished without moving the magnets.**

After the meter is once adjusted the entire moving element may be removed without seriously affecting the accuracy of adjustment.

SANGAMO

Simplified adjustment is only one of Sangamo features which you will appreciate. Let our nearest agent send full information. Ask for Bulletin 5518 fully describing type H alternating current Watthour meters.

Sangamo Electric Company
of Canada, Limited

Factory: TORONTO **Head Sales Office: MONTREAL**

MASCO

Now is the time to sell Electric Heating

The coal shortage is the electrical dealer's opportunity to sell the electric heating idea.

WE STOCK

Heavy duty receptacles and wiring materials.
Heaters and electric grates of every capacity.
Ranges and water heaters.
Electric table utensils.

The Masco Company, Ltd.
76-78 RICHMOND ST. EAST, TORONTO

Jobbers of Standard Electrical Merchandise

RayLite

Patented Registered

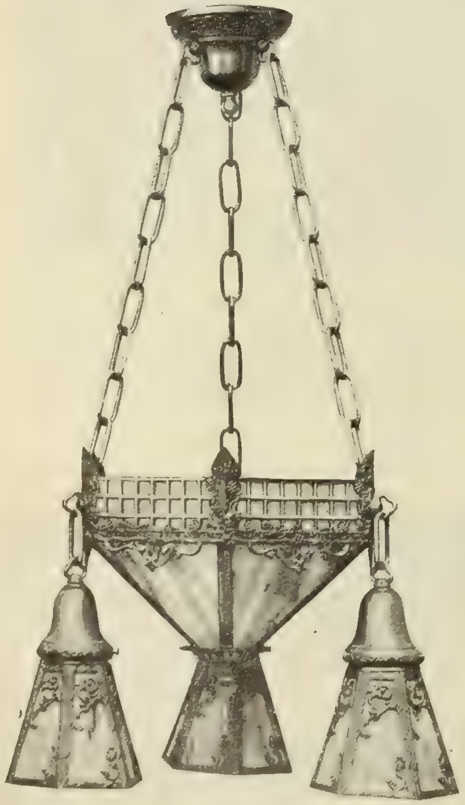
No. 2841 Gothic

"Raylite" the fixture being specified for the most important installations—because it offers the greatest value.

Being so well and favorably known, "Raylite" is the easiest and most profitable to sell.

New Raylite Catalogue now ready.

Tallman Brass & Metal Limited
HAMILTON, ONT.



1117C

Retail Value	$25.00
Trade price complete as shown, not wired	$11.25

WILTON ELECTRIC

POPULAR PRICED FIXTURES

Our New Catalogue Now Ready

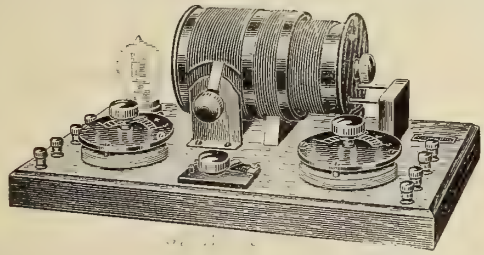
Illustrates a large range of low priced Fixtures and Glassware, Portable Lamps, Appliances, etc.

Write for Catalogue No. 7 E.N.

F. R. Wilton Electric Co.
124-128 Richmond St. West TORONTO

What Can We Sell You For Christmas Trade?

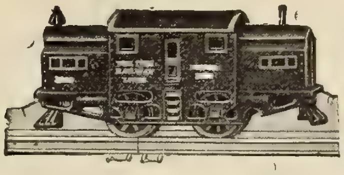
RADIO

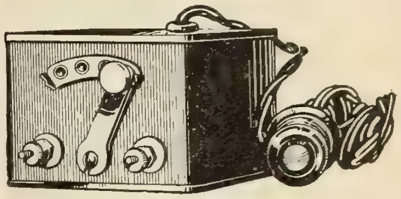


4019 Audion set. Retail $35.00

Head Phones, Crystal Sets, Loud Speakers, Condensers, Variometers, Amplifiers, Sockets, Strain Insulators, Etc., Etc.

ELECTRIC TOYS





Toy Transformers

Electric Trains, Electric Sets, Phone Sets, Transformers, Toy Motors

SEND FOR GILBERT TOY and IVES' TRAIN CATALOG

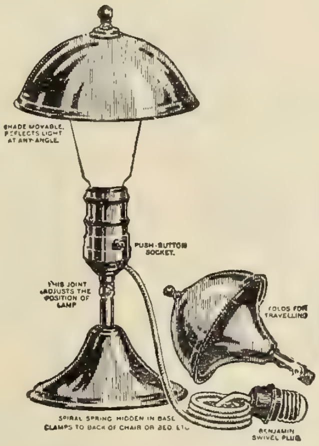
Wallace Adjustable Lamp

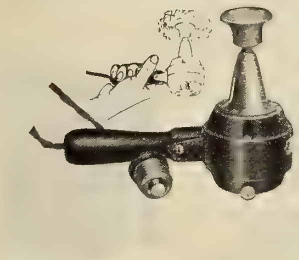
These lamps are real profit producers at the Xmas Season

Try our assortment No. 1

$43.20

Containing:
6 B Brass Wallace Lamps
2 each Nickle Bronze, and
Verde Enamel.


SHADE MOVABLE, REFLECTS LIGHT AT ANY ANGLE
PUSH-BUTTON SOCKET.
THIS JOINT ADJUSTS THE POSITION OF LAMP
FOLDS FOR TRAVELLING
SPIRAL SPRING HIDDEN IN BASE CLAMPS TO BACK OF CHAIR OR BED, ETC
BENJAMIN SWIVEL PLUG



Everybody will buy a Vibrator at $7.50

The $15.00 Vibrator sold well last holiday season.

THIS ONE WILL SELL BETTER

TIME IS SHORT—ORDER NOW PLEASE

B-90 Electric Polar Cub Heater

Marvellous value for $7.50 retail

Solid copper reflector, 11" diameter, cast iron base, detachable filament, two-piece separable plug.

The A. C. Gilbert - Menzies Company Limited

439 King St. W., TORONTO

GILBERT POLAR CUB Electrical Specialties **GILBERT RADIO**

The Electrical Dealers' Opportunity

RADIO

Equipment For Profitable Sales

Important Announcement

We take pleasure in announcing that we have opened a Radio Division and that we now are going into production on Headset Receivers, Receiver Plugs and Jacks.

A limited number of high class Crystal Receiving Sets (Variometer type) are now available for delivery.

Radio Dealers: Write for full information and prices.

Contracts: Enquiries solicited from responsible parties wishing to contract for the manufacture of non-patented Radio Appliances.

Caron Brothers, Inc.
Radio Division
233-239 Bleury Sreet - Montreal

-Just Good Equipment-

GENERATORS— D.C. 125-250 volts

1-2-3-5-7½-10 Kw standard makes rheostats and pulleys.

A.C. 60 cycle

15-30-50-75-100-300 Kw pulleys, bases and rheostats.

MOTORS— A.C. 60 cycle 3 phase

3-5-7½-10-20-30 H.P. and upwards all complete.

All sizes of repulsion type single phase motors.

A.C. 25 cycle 3 phase

1-2-3-5-7½-10-25-30-40-50 H.P. and upwards all complete.

All sizes of single phase motors, repulsion type only.

SEE——RADIO——SUPPLIES

YES—We can supply you with that receiving set you want. OR get that loose-coupler, tuning coil, condenser, insulator, grounder, battery, detector, wire, variometer FROM US.

ASK US QUESTIONS ABOUT YOUR SET OR WHAT YOU WILL INSTALL.

Industrial Engineering Company of Canada, Limited
Consulting Engineers—Electrical Equipment
R. G. Lee, General Manager
TORONTO OFFICE: 28 Wellington St. W., Carlaw Bldg.

WIRELESS

"ESCO" Motor-Generators for Generation of High Voltages

NORTHERN ELEC. CO.—Complete Peanut Tube Receiving Sets

JEWELL INSTRUMENTS
CONDENSITE-CELORON
BAKELITE—Complete assortment of Panels, Sheets, Tubes, Rods.

EVERETT PHONES, FROST PHONES
CHELSEA CONDENSERS

Price List on Application

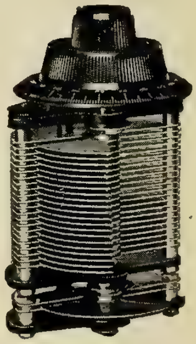
Dealers are asked to write for special discounts

BROCK RADIO Co.
B.L. SILVER RADIO ENG.
357 St. CATHERINE St. W. MONTREAL. PHONE UP6861

"I Picked Winners"

Was the answer of a prominent business man to a question as to the secret of his remarkable success.

"United" Variable Condensers and Transformers are Winners. Back of them is a half-million dollar equipment and a staff of real Radio engineers.



"United" Variable Condensers

Without Vernier, Dial or Knob

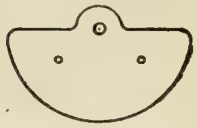
43 plate	$4.50
23 plate	4.00
11 plate	3.50
5 plate	2.75
3 plate	2.25

"United" Variable Condensers

With Vernier, Dial and Knob

46 plate......$6.50 26 plate......$5.50

The only Vernier with stop



Mounting made easy by our template for locating panel holes; packed free with each condenser.

"United" Transformers

Fully mounted as shown, black enamel with buffed nickel plated strip $4.50

Liberal discount to jobbers, and their dealers

Send for Circular

Patent Applied For

UNITED MFG. & DISTRIBUTING CO.
CHICAGO 536 Lake Shore Drive ILLINOIS

QUALITY RADIO SUPPLIES

Listed below are a few of the many lines we stock:

MURDOCK	MULLARD
FROST	CHELSEA
FEDERAL	U.S. TOOL
BROWN	NORTHERN ELEC.
MAGNAVOX	ELECTROPLAX

Send for New Price List of Sept. 15th

TORONTO RADIO COMPANY

Wholesale Only 147 Victoria St. Toronto, Ont.

MOTORS

TRANSFORMERS, COILS

Used Motors for Sale

Write for our price list

COILS FOR ALL MAKES OF MOTORS

Repairs on Electrical Apparatus Our Specialty

Canadian Armature Works

St. Catharines, Ontario

Looking Ahead

Owing to the increased volume of business we have secured larger premises at

29 Duke Street, Toronto

On and after October 15th, 1922, we will be in a position to meet your demands for High Grade Radio Parts.

Tomlinson & Forbes

216 Victoria St., Toronto

—KYLE—

BORING MACHINE

Makes boring tube holes in joists easy

Bores holes at any angle

Adjustable from 4½ to 13½ feet

Price $29.00

Dealers write for full particulars

Distributors wanted in every Province.

Ren Automotive Supply Co., Ltd.

Preston—Ontario

CONNECTICUT

Telephone Equipment

Interior Telephones For

Apartment House
Factory
Schoo
Hospital
Office

Electric Reset Annunciators

and signal specialties

Hospital Signal Systems

A complete new silent call system for hospitals. Registers at nurses' quarters and office with time record, if wanted.

Canadian Factory Representatives:

Cochrane, Stephenson & Co., Ltd.
265 Portage Avenue
Winnipeg, Man.

Cochrane, Stephenson & Co., Ltd.
608 Pacific Building,
Vancouver, B.C.

Timberlake & Bourne,
New Birks Building,
Montreal, Que.

The Pierce Electric Company
39 Richmond St., East,
Toronto, Ont.

CONNECTICUT TELEPHONE & ELECTRIC COMPANY
Meriden Connecticut

Catalog or bulletin mailed on request

Tenders

A few dollars spent in advertising your proposals in

The Contract Record

would result in additional competition which might save your city or town or your client many hundreds of dollars.

Get Ready for This

Be prepared for a big Christmas season's selling of Canadian Beauty Appliances. Just so there will be no possible chance, we are going to run at selected intervals three large-sized fresh new advertisements.

These three advertisements suggest in a new and powerful way that Canadian Beauty Appliances make wonderful gifts. Has it ever struck you that of all the goods dealers handle, electrical appliances are the most suitable as Christmas gifts? It's a fact.

Take full advantage of this. Dress up your window with Canadian Beauty Appliances so that you will cash in on this striking advertising. Keep a good stock on hand and give it a good show inside the store.

Be ready for the early shopper. Sow the seed of the gift idea early. Don't wait until after Christmas shopping has begun. If you do you'll lose out on some good business. Stock up now—right now! Be ready for the "earliest worm!"

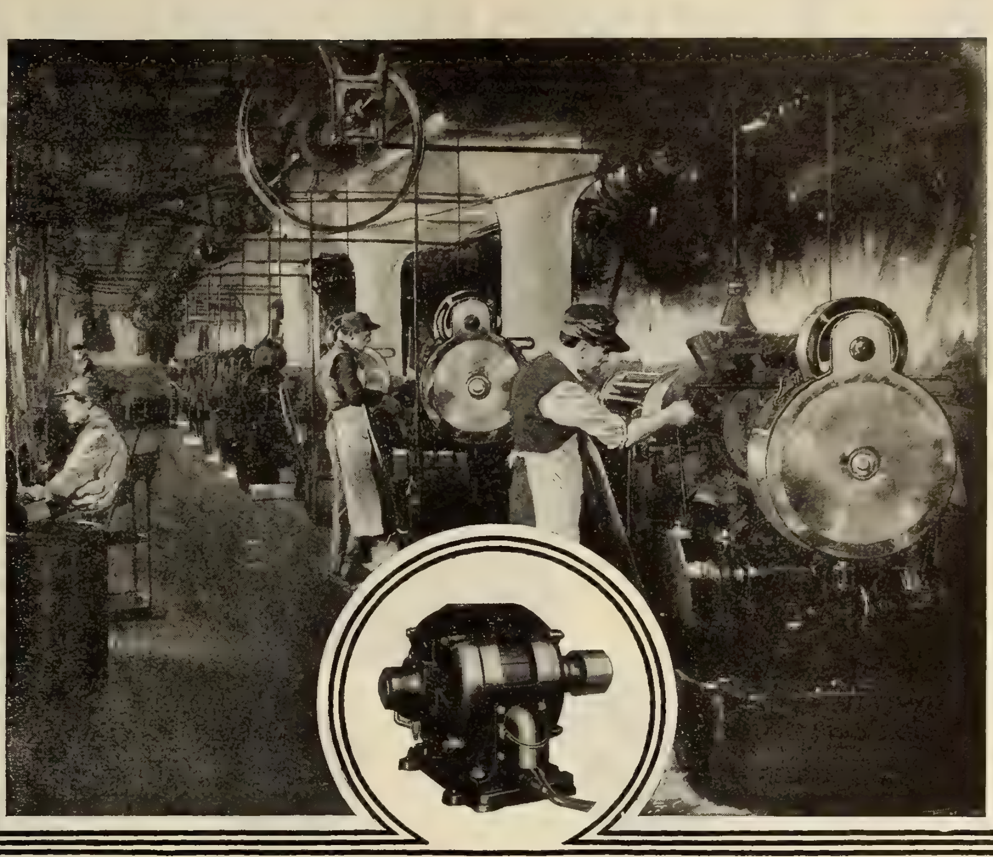
This Christmas Gift Campaign for Canadian Beauty is really splendid. Dates on which the advertisements will appear in the big Canadian daily papers will be sent you shortly. Meanwhile, we are "all set" to fill your orders.

Renfrew Electric Products Limited

Makers of Majestic Sun Electric Heaters and Grates.
Also Canadian Beauty Electric Appliances—Irons, Toasters,
Grills, Percolators, etc.

General Sales Office:
29 Richmond St. West,
Toronto, Ontario

Factories and
Head Office:
Renfrew, Ontario



THE workman on premium or piecework, the factory superintendent, the production manager, the plant engineer—all find R & M motor reliability an important factor in their work. The low temperature rating, large overload capacity and rugged construction of the motors reduce maintenance expenses and keep the wheels turning during periods of forced production and heavy overloads as well as during times of normal demand. Every man in the plant who is responsible for production and operating costs will usually say a good word for the R & M motors when new equipment is needed.

And every factor in the distribution of R & M motors, contractor, dealer, jobber, finds this attitude of the factory men who use the motors, an influence which makes for a steadily increasing motor business.

The Robbins & Myers Company of Canada, Limited

Brantford - Ontario

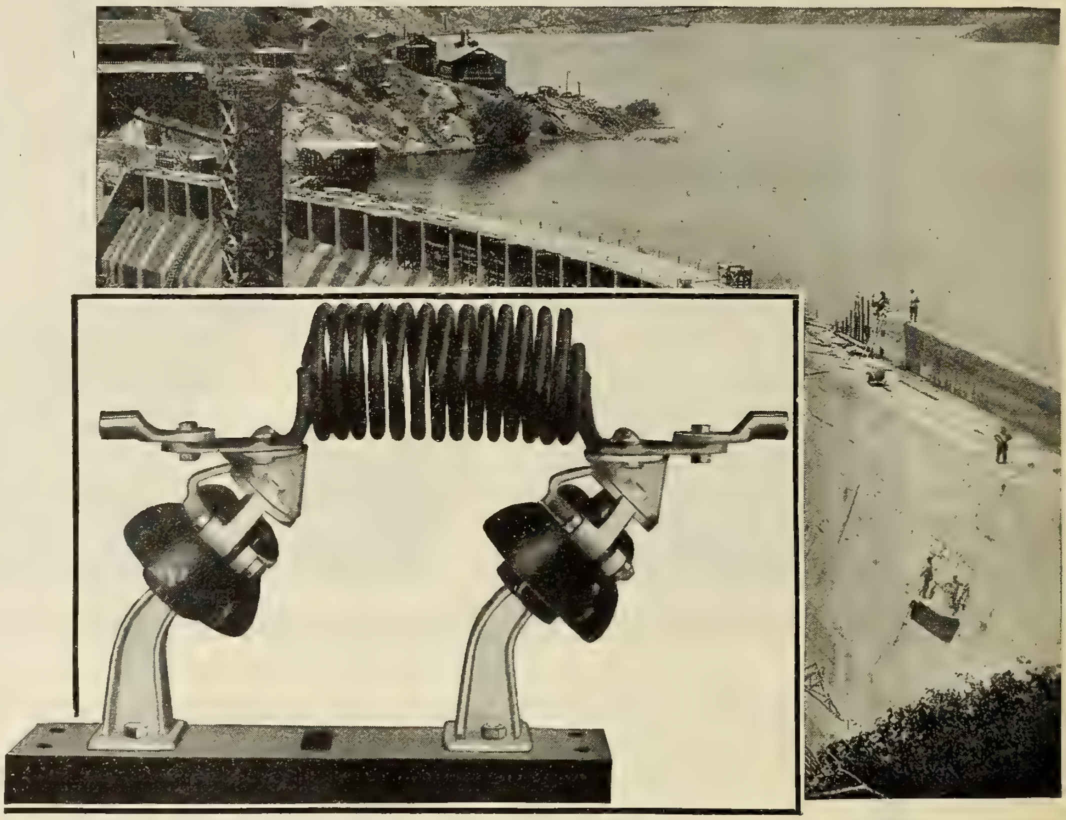
Robbins & Myers Motors

High Tension Securities

Choke Coils that Stop Lightning and Protect Your Equipment

We also build the following equipment:

- Indoor Bus Supports
- Indoor Disconnecting Switches
- Indoor Switchboard and Structural Fittings
- Outdoor Disconnecting Switches
- Choke Coils
- Copper Fittings
- Outdoor Substations



Like a concrete dam that stops the torrential cloudburst and protects the peaceful valley below—ELPECO CHOKE COILS stop the surges and turn them back through the arresters to ground.

ELPECO CHOKE COILS are fitted with longitudinal braces for service at 25,000 volts or more, to prevent distortion under short circuit.

ELPECO CHOKE COILS are built not only for ordinary service, but for the emergency, as well—those short circuits that cause heavy stresses and that break down ordinary switches and coils.

Protect your lines against surges

Write today for bulletin.

ELPECO

ELECTRIC POWER EQUIPMENT CORPORATION
PHILADELPHIA

Canadian Representatives: FERRANTI METER AND TRANSFORMER MFG. CO., Limited, Toronto & Montreal

Electrical News
Generation, Transmission and Application of Electricity

For nearly thirty years the recognized journal for the Electrical Interests of Canada

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NEW YORK - - - - - - 296 Broadway
CHICAGO - - - 14 West Washington St.
LONDON, ENG. - - 16 Regent Street S.W.

ADVERTISEMENTS

Orders for advertising should reach the office of publication not later than the 5th and 20th of the month. Changes in advertisements will be made whenever desired, without cost to the advertiser.

SUBSCRIPTIONS

The "Electrical News" will be mailed to subscribers in Canada, Great Britain and British possessions post free, for $2.00 per annum. United States $2.50. Other foreign countries $4.00. Single copies 15 cents. Remit by currency, registered letter, or postal order payable to Hugh C. MacLean Publications Limited.

Subscribers are requested to promptly notify the publishers of failure or delay in delivery of paper.

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Vol. 31 *Toronto, November 1, 1922* *No. 21*

Start Early—Make It an Electrical Christmas

The importance of an early start for Christmas business is yearly becoming more deeply embedded in the minds of the electrical trade. The old proverb about an ounce of foresight being worth a pound of hindsight is being taken to heart, and we find live dealers are already considering ways and means of beating their previous holiday sales records.

Christmas sales are comparatively easily made. The season is a sort of spending festival, and all purse strings are loosened. A tide of easy money flows in the weeks before Christmas day.—What we want to do is to secure the greater part of it for the electrical trade.

The problem is a pyschological one, as most selling problems are. From the first of December everyone is thinking more or less of what he is going to buy for Christmas presents. Impress him with the appropriateness of electrical gifts, stress their points of economy, beauty and utility. Do this in sufficient measure, and he is sold.

This year radio is going to be a leader. It is bound to sell to a certain extent whether any effort is put behind it or not, but with a little forceful selling it will sweep the boards as a novelty gift. Suggestion to the public is what is required—advertising suggestion that the broadcasting will be better than ever this year, that a set is in an attractive addition to a home, that it is educational, that a boy who has waited for a set since last spring deserves one now—little ideas that direct the minds of the public.

Electrical toys are things that are not as familiar to the public as they should be. They are, in general, sturdy, value-giving things and they can add considerably to the holiday sales. Publicity will sell them in greater numbers.

Then we have the multitude of practical electrical gifts. Hundreds of suitable presents are included under this head. These are the backbone of the Christmas business and an attractive display is bound to catch the shopper's eye.

The main thing is, **start early** and plan your work. Decide what your campaign is going to be, plan your windows, place yourself in the position of the public and figure out **what would induce you** to buy electrical gifts in an electrical store.

Start early—Make your store Headquarters for an electrical Christmas! Feature this slogan:

Buy Electric Goods
for Christmas
in an Electric Store

Increased Earnings of Power Companies Indicate Better Business

The earnings of the power companies in general show an increase over those of the previous year, another evidence of the increasing growth of business.

The annual report of the Calgary Power Co., covering the year ending December 31, 1921, shows an improvement in earnings of the company, gross standing at $303,724, against $291,041 for the preceding year. Operating expenses, bond interest, taxes and other charges absorbed $229,371, leaving a net profit of $74,352 as compared with $58,358 for the previous year. After appropriating $50,000 for depreciation and bond discount the balance remaining at credit of surplus account and carried forward to 1922 is $199,955.

The earnings of the Ottawa Light, Heat & Power Company for the eight months period ended August 31, 1922, according to a recent statement amount to a gross total of $1,079,797 as compared to a total of $1,031,239 for 1921. The deduction of operating expenses and bond interest leaves a surplus of $199,015 as compared to $169,572 the preceding year.

The gross earnings of the Southern Canada Power Company and its subsidiaries for the seven months ending August 31st, 1922, amount to $773,027 as compared to $681,299 for 1921. The deduction of operating expenses leaves net earnings of $427,163 as compared to $336,356 for 1921, an increase of $90,806.

Huge Success for Customer Ownership Drive

The plan of linking up a central station power company and its clients in closer relationship through the medium of stock ownership in the business was tried out for almost the first time in Canada during the month of October by the Southern Canada Power Company Ltd., and has proven to be an unqualified success. The allotment of 2,000 shares of that company's preferred stock was oversubscribed in four days. The campaign was originally intended to last ten days. Had the allotment been considerably larger there would not have been any difficulty in disposing of the full number of shares.

The Southern Canada Power Company Ltd., has nearly

14,000 customers in a territory comprising fifty municipalities. No customer was allowed more than ten shares. 200 employees of the company were divided into five teams, each one headed by a local superintendent as captain and assisted by officials from the headquarters of the company, where team work, young and energetic spirit, good fellowship and ambition to do things and to do them right are ever present.

J. B. Woodyatt. vice-president and general manager of the company L. C. Haskell, secretary treasurer, and P. T. Davies, commercial manager, were naturally pleased with the reception their campaign met with. Mr. Woodyatt especially as the chairman of the Public Relations Committee of the Canadian Electrical Association sees considerable merit in such a practice. Mr. Percy H. Whiting, of the Central Maine Power Company, Augusta, Me., assisted in the preparation of the necessary publicity and assisted in directing the campaign, his experience in such campaigns in the United States being of great value.

A noticeable feature about this campaign was the thorough preparation of the soil and the careful planting of the seed without which no good harvest may be expected. All newspaper advertising, broadsides, application blanks, and other publicity literature was printed in both English and French languages. The newspaper advertising consisted of full page announcements. The first announcement quoted the Babson Statistical Organization and Mr. Babson's recent recommendation not only to buy power company stocks in preference to all others, but to buy stocks of your home company. It happened that Mr. Babson had recently published a number of reasons for his belief that investments in local power and light companies are best at the present time and these statements were effectively used by the company in their first newspaper publicity. The second step was a full page announcement covering the activities of the Southern Canada Power Company, explaining when it was formed, giving the names of the towns and cities served, outlining power possibilities, attractiveness for industries of every kind, and so on. This advertising was designed to impress readers with the stability and virility of the company.

So far the publicity was of a general nature. It was now narrowed down to the customers of the company, who were given a definite offer to purchase preferred stock in the company either for cash or on partial payment terms. In the same envelope purchase order was enclosed. A day or two later a little booklet entitled "Ten Reasons Why I Believe the Six Per Cent Stock of the Southern Canada Power Company Is a Good Investment," was mailed to customers, and this was followed up a little later by a folder giving, for the last nine years, the number of customers and the assets and liabilities figures. The last and seventh piece of literature was a booklet, further accentuating the favorable financial and physical condition of the company, giving a few suggestions on how to judge an investment, pointing out that the yield on this offering was usually favorable and explaining that an employee would call. The last step was the personal call of the employee, which as already noted resulted in a considerable over-subscription of the stock offered.

Toronto Section A.I.E.E. Hold Smoker and Membership Night

A very enjoyable social evening was spent at the Engineers' Club Friday, Oct. 13th, by the Toronto Section of the American Institute of Electrical Engineers. The Institute has a membership of some 14,000 in different parts of the world with a Canadian Section of 700.

The musical programme was interspersed by interesting talks by local members. Mr. Frank Ewart of Toronto who is vice-president of the Institute described very graphically the aims and objects of the Institute. He pointed out, that although the advancement of the theory and practice of electrical engineering was the chief aim and object of the A.I.E.E., the membership was not necessarily restricted to men of technical education. He made it very clear that technical men need the co-operation and assistance of non-technical men engaged in the electrical industry.

Mr. C. E. Schwenger gave a brief outline of the proposed activities of the Toronto Section for the coming year, which will mainly consist of papers by prominent engineers.

Mr. A. H. Hull who is a past chairman of the Toronto Section gave some very interesting facts about the Journal. He drew attention to the very high standard of the editorial matter, and made particular reference to the magnificient library of technical books maintained in New Yory at the Institute's headquarters.

The musical side of the programme was supplied by an orchestra of the members of the section. Mr. Archie Ewart as violinist, Mr. Jack Robinson, saxaphone and Mr. Malcolm Wood, pianist. Major Jukes who has a very fine baritone voice rendered several songs. There was a record attendance of 170 and all enjoyed a very entertaining evening.

Montreal L. H. & P. Consolidated Petition for Tariff Revision

On October 5th, a petition was formally filed with the Public Utilities Commission on behalf of Montreal Light, Heat & Power Consolidated. The changes asked for involve a reduction of the charge for current from six to five cents per kilowatt hour, the abolition of the monthly minimum bill as well as the monthly meter rental, and the substitution of a monthly service charge of 50 cents per month per meter, for those using electricity only, and 25 cents for those using both gas and electricity, with sundry minor changes.

Sections 1 and 2 of the petition read as follows:—

1. "The standard of tariff rates presently in force for the supply of electric current for lighting purposes by the petitioners is as follows: Temporary contracts, 6 cents per k.w., monthly minimum bill, 50 cents, monthly meter rental, 15 cents: One year contracts, 6 cents per kw.h., 5 per cent. discount, net 5.7 cents, same minimum bill and meter rental; five-year contracts, 6 cents per kw.h., 20 per cent. discount, net 4.8 cents, same minimum and meter bills.

2. "The company petitioner is desirous of revising the said tariff of rates so as to reduce the base rate from 6 cents per kw.h. to five cents per kw.h., abolishing the monthly minimum bill, as well as the monthly meter rental, and substituting in the place of the two latter items a monthly service charge of 50 cents per meter per month in the case of electricity users only and 25 cents per electric meter per month in the case of dual service customers using both gas and electricity."

After setting forth the table of rates these changes will make, the petition asks that the proposed new rates be approved, applicable to all meter readings, on and after January 1, 1923.

Peak Load for Winnipeg Hydro

The Winnipeg Hydro will be getting its peak load about the middle of December for the year 1922. It is estimated that they will be delivering from Point du Bois 60,000 h.p. which is about 15% in excess of the peak load for 1921. This will leave the Hydro with 20,000 h.p. available for immediate sale, together with an additional 35,000 h.p. that could be developed, if required, in nine months.

Meeting of Toronto Chapter I. E. S.

The Toronto Chapter of the Illuminating Engineering Society held its first meeting of the society year on October 23, in the Engineering Building, University of Toronto. Prof. G. R. Anderson, the chairman, addressed the meeting and stated that this first gathering was more or less of a get-together nature, that plans for the year might be decided on. He then gave a short talk on the history of illumination tracing its development from the first crude oil lamps of the ancients. Several lantern slides were exhibited showing the improvements that have been made, up to the latest types.

Several of these latest types of lighting apparatus were on hand, and were demonstrated by Prof. Anderson. The Sheringham Daylight Unit was shown to be a color matching light, of such construction that the excess of red and defect of blue, characteristic of artificial light, are balanced by reflection. The accomplishment of the same result by using a suitable globe was also demonstrated. What may be called the latest type of arc lamp was shown in the "point light lamp." This is an enclosed tungsten filament lamp using direct current. The filament is of peculiar construction, two steps being required for starting. This lamp is used mainly for signalling. Other recent developments demonstrated by the chairman included the Neon lamp, a low current user, and bulb projector lamps. A mercury arc, and a searchlight of recent type were also shown. A very simple method of testing automobile headlights for glare, which has recently been brought out in England, was also explained; this method includes the use of a disc with irregularly shaped figures and the test is as to whether these can be distinguished at a certain distance from the car. Prof. Anderson concluded his address with this description and opened the meeting for discussion.

Several members present were of the opinion that an effort should be made to bring more of people like architects and electrical contractors, who actually install lighting, to the meetings of the society. Mr. G. G. Cousins stated that he thought the members of the chapter should do some missionary work, but their primary object was to educate themselves. Mr. Frank Groome came out strongly for the inclusion of as many as possible in the meetings of the society; he suggested more popular programs. Messrs. C. B. Stephens, J. Scott, W. Woods, D. C. Ferguson, Watson Kintner, and others also contributed to the discussion.

Canadian Electric Railway Association Activities

The Association's executive has appointed the following special committees:

Standards: G. Gordon Gale, Vice President and General Manager, Hull Electric Co., chairman; D. E. Blair, Superintendent of Equipment, Montreal Tramways Co.; E. P. Coleman, General Manager. Dominion Power & Transmission Co.; C. C. Curtis, Manager, Cape Breton Electric Co; W. G. Murrin, Assistant General Manager, British Columbia Electric Ry.

Public Relations: A. W. McLimont, Vice President, Winnipeg Electric Ry., chairman; G. Kidd, General Manager, British Columbia Electric Ry.; W. J. Lynch, General Manager, Quebec Railway, Light, Heat & Power Co.; E. W. Oliver, General Superintendent, Niagara, St. Catharines & Toronto Ry.; M. A. Pooler, General Manager, New Brunswick Power Co.

Safety: J. F. H. Wyse, General Manager, Ontario Safety League, chairman; C. C. Curtis, Manager, Cape Breton Electric Co.; W. H. Darracott, chief clerk to Manager, Winnipeg Electric Ry.; W. R. McRae, Superintendent of Rolling Stock and Shops, Toronto Transportation Commission; R. M. Reade, Superintendent, City Division, Quebec Ry., Light & Power Co.

It is proposed to appoint a special committee on the government classification of electric railway accounts, to deal particularly with maintenance and depreciation questions.

Sub-station for Montreal & Southern Railway

A contract has been let by the Montreal and Southern Counties Rly., to Nicholson Constructions Ltd., Montreal, for the erection of a sub-station building at South Kensington, Que. It will be built of cement, brick and steel, and its inside dimensions will be 16 x 28 ft. and 14 ft. high. There will be installed in it a 500 kw. rotary converter, the contract for which complete, has been given to Canadian Westinghouse Co. The company has also ordered a Wilson plastic arc rail bond welder complete with truck, from Ohio Brass Co., and 2 motor and 2 trailer interurban passenger cars from Ottawa Car Manufacturing Co.

Forest Fires Damage Northern Power Lines

The recent forest fires in Northern Ontario burned up many miles of transmission line in the mining districts. Service was, of course, interrupted, and the mines turned to whatever auxiliaries they had available. The main need was for power for pumping and lighting purposes, and for the agitators in the mills of some of the mines. In the restoration of service, power was first received at Kirkland Lake from Charlton. Linemen worked night and day on the damaged transmission lines, and on October 16, it was reported that all the Cobalt mines were working with all the power they required.

The street cars which have been discarded by the Toronto Transportation Commission are now the havens of many homeless families throughout the fire-swept districts of Northern Ontario. Eighty-seven have been shipped from Toronto. They are to be distributed as follows: Haileybury, 60; North Cobalt, 10; Charlton, 10; Thornloe, 5; Heaslip, 2.

Largest Turbine-Generator Unit Yet Constructed

The largest turbine-generator ever constructed in a single unit is now being built by the Westinghouse Electric & Manufacturing Company for the new Hudson Avenue Station of the Brooklyn Edison Company. The unit will have a rating of 62,500 kv.a., three phase, 60 cycles, 13,800 volts at 80 per cent power-factor. The operating conditions for the turbine will be 265 pounds steam pressure, 200 degrees Fahrenheit superheat, and 29 inches of vacuum. Two 70,000 square foot surface condensers, probably the largest in existence, are also being constructed by the Westinghouse Company for this new station. Each condenser will be served by two half capacity circulating pumps driven by two-speed induction motors. The air removal equipment will consist of Le Blanc air pumps and air ejectors.

The ultimate capacity of the plant will be eight turbine-generator units. Distribution will be at 27,600 volts, instead of at 13,800 volts as in the other New York power plants, because of the difficulty of getting out sufficient circuits with the limited street space. The switch house of the plant will use a vertical segregated phase arrangement of oil circuit breakers instead of the horizontal arrangement as at Hellgate and Calumet. Auxiliaries will be largely electrically driven, and a house generator will be used for supplying the essentials of auxiliary load. To insure continuity of service a careful study is being made of the various systems of supplying power to auxiliary busses.

The Application of Electricity in the Manufacturing Industry--9

Electric Logging a New Development in the Lumber Industry—Donkey Engines Being Replaced by Electric Motors—McFarlane Skyline System—Power Lines in Woods—Electric Rafting

The term logging, as generally used, refers to all bush operations. Such operations include the cutting of the timber and its transportation by various means to the pulp or sawmill. In this connection electricity has been used to some extent as a motive power, and its use is certain to become more widespread, as news of the success attending the present installations is disseminated. Lumbermen as a class are broad-minded and progressive and quickly adopt any device or method that is shown to be of proven worth.

Locality Determines Logging Methods

The conditions of logging vary greatly according to the locality. In some districts it is possible to cut the timber and float it down to the mill with very little trouble. In other localities the timber stand is at some distance from rail or water, and the logs are moved over ice or wagon roads to the skidways. These regional characteristics are a determining factor in the choice of equipment, and when a change is made to electrically driven apparatus, the engineer is generally called upon for a decision, which should only be given after a thorough study of conditions.

Logging With Donkey Engines

In the ordinary case, say where logs have to be moved a distance of a mile and a half to water, the old type of equipment includes two donkey engines. One is mounted as close as possible to the stand of timber, and drives a hoisting drum. A log is felled, it is hitched to a cable, which is wound up on the hoisting drum, and drawn as close as possible to the donkey. It may be then hitched to a longer cable and drawn by the other donkey engine over a long skidway to the water's edge. The first donkey operates up to around 3,000 feet, the second may have a haul of over a mile. Such a long cable, of course, runs over pulleys and the friction of the logs is reduced by the skidway. When electric power is used it simply means that the donkey engines are replaced by electric motors.

Logs Skidded With Electric Power

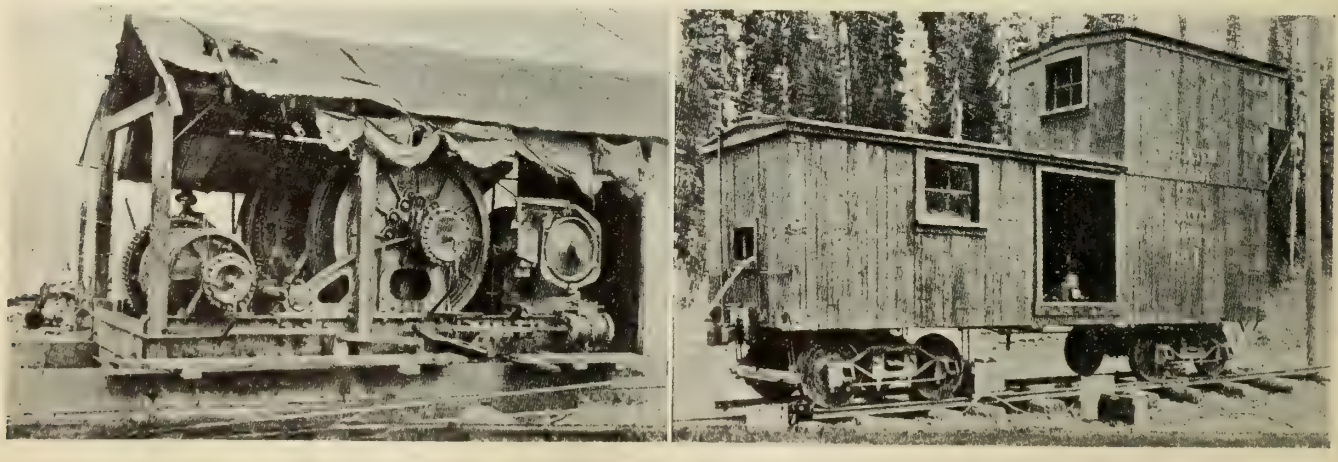
One of the first applications of this kind was made in 1918 in a locality, where the logs were first skidded down and then loaded on the cars of an electric railway. The yarder or hoist, used was a three-drum device, driven by a 200 h.p. wound rotor motor, using 10 cycle current. The car loader was driven by two 75 h.p. wound rotor motors. Both devices were mounted on a 60 foot sled, similar to a steam donkey sled, and it was noticeable that the three motors occupied only as much space as one steam donkey.

At first it was found difficult to obtain the slow speeds necessary. This trouble was overcome by introducing extra resistance into the phases of the motor, whereby great flexibility was obtained. Lumbermen were severe critics of the installation before it was operated, claiming that the sudden strain to which a yard engine is subject, as for example when a log strikes a stump or rock, would cause the motor to burn out. These proved to be false prophets, however, relays and outside resistance had been provided to take care of the excess current and there was no trouble on that score.

Skyline Logging

In one run of forty-four days this outfit handled 3,144,898 feet of logs, or an average of 71,474 feet per day. The average was later increased by adding to the transformer capacity, and ran over 77,000 feet per day. Another interesting installation was made in a country where the logs have to be removed from fairly steep hillsides. In this case the logging apparatus was of a special type, known as the McFarlane Skyline System, which uses a one and a half inch steel cable of which one end is anchored to standing timber on the crest of the hill, and the other fastened to the hoisting drum of the donkey. The cable may be carried out a distance of four thousand feet where the logs are of such a weight that they will not cause too great a sag. The logs are brought in by a carrier or trolley, and the entire hillside is cleared within its travel.

The motors used in this case are 150 h.p., 600 r.p.m., taking 60 cycle current at 550 volts. They are totally enclosed, and of heavy duty construction. Control apparatus



Left—Electrically driven log hoist; Right—Transformer car used in electric logging is mounted on the same sled, and consists of a seven point controller connected to a bank of resistance grids. This also operates the primary circuit, and the drive is thus self-contained. The operator has an ammeter in full view, and this together with a time element oil circuit breaker, shows him how far he can go with the cable. Another 7½ h.p. motor is used to operate a compressor which supplies air for the brakes.

Power Transmitted Through Woods

In this case power is transmitted at 11,000 volts from the sawmill power plant, which was 3½ miles from the logging operations at the time the installation was made. The line is run through the woods, using the trees as poles and runs at the logging end, into a portable sub-station, mounted on flat cars, as shown in the photograph. The sub-station equipment consists of 200 kw. oil-cooled transformers, which are protected on the primary side by expulsion fuses and horn gap arresters. The motors are supplied from the sub-station by a triple conductor, 000 cable, steel armoured and lead covered.

Average Power Input

A test was carried out on this installation, and it was found that running out light the carrier showed an average power input of 63 kw. When hauling in logs scaling 1,000 to 1,500 feet, the average power input was 104.1 kw. The same motor was used for hoisting logs on cars, and it was found that this required an input of 80 kw. In this regard, it may be pointed out that a 50 h.p. motor with light hoist would have ample capacity for loading logs on either rollways or cars. A separate installation of this size would effect a decided saving in time and power consumption. The application of solenoid load brakes makes it possible to do all a steam loader can do, and in addition to hold a log suspended in mid-air or in any position desired.

The Average Haul

For this particular installation, the average haul was found to be around 33,000 feet a day for one donkey. Latterly, certain improvements have brought the average up to 50,000 feet per day, and it is expected that this record will be maintained. The rate of haulage varies directly according to the speed of the trolley, and, of course, this can be increased—experimenting is now going on to determine limiting speeds. At first the rate of trolley travel was fixed at 1,000 feet a minute, but this has been increased to 1,200 feet per minute, hauling an average load of 1,700 log feet. The timber handled was white pine logs.

The owners of this electrical skyline installation are quite enthusiastic about it. They say that aside from the advantages of the skyline method, which keeps gravel out of the bark and prevents disasters to the saws, the electric apparatus saves time and worry.

Electric Locomotive in Logging

In localities where the area of cutting is some distance from suitable water courses, the felled timber is taken out on railway lines. The electric locomotive is almost ideal for handling this work because of its economy. Any logging locomotive is called upon to negotiate heavy grades and do a large amount of switching, which burns up a lot of fuel with steam as the motive power, because of the necessity of keeping good pressure up at all times. Another saving is made in the labor required, and in time required to get up steam, etc.

Electric Rafting

Electric power has recently come into use for rafting operations. The accompanying photograph illustrates the rafting and sorting ground of the Nashwaak Pulp and Paper Company on the Nashwaak River, N. B., where electric power is used for loading and sorting operations.

The logs arrive at this point after being driven down the main Nashwaak River. Here they are sorted and made up into rafts, which contain approximately 1,000,000 feet of lumber. These rafts contain a bottom layer of logs that float lengthwise of the stream, with others on top, crosswise. The illustration shows the raft loading apparatus. Current is carried out across the stream to the motor shed, which contains a squirrel cage motor. This motor drives a roller chain, which hoists and loads the loger. With this apparatus an average of 10,000 pieces per working day of nine hours was made.

Power Supply for Logging Operations

In many localities the logging camps are within reasonable distance of transmission lines and there is no difficulty in obtaining sufficient power from the central station companies. Power lines may be comparatively cheaply put up, as trees in the woods may be used for towers. Simplicity,

Rafting and sorting ground of Nashwaak Pulp & Paper Co.,—10,000 pieces a working day are handled by the electrically driven roller chain with safety, is what is generally desired in this type of line and it has been found possible to erect a line of this description at a cost of less than $800.00 per mile.

The cost of power when supplied by central station companies varies within wide limits—one cent a kilowatt hour is a rate that works out at below $30.00 per horse-power per year for ten hour, 300 day operation. This figure is high, of course, for the majority of cases.

It will be found that many operators maintain a small mill near the site of their logging operations. In many cases the equipment is steam-driven, but the owner may be shown how the exhaust steam from the boilers will drive a turbine, and furnish enough power for the logging end of his business.

Results Secured by One Company

It is estimated by one company that a saving of 50 cents per 1000 on the cost of hauling timber is made by electric drive. This company in one year hauled 81,000,000 feet of logs and they figure a saving of over $28,000 on those operations.

Advantages of Electric Logging

The outstanding advantage of electric logging is in its elimination of fire risk. This is a point that is becoming of increasing importance, an argument that carries great weight. Other advantages may be tabulated as follows:—

1. The use of good wood for fuel is eliminated. It takes 1,000 feet a day to fire an engine.
2. Low maintenance costs. No replacing packing, grease caps, etc., and no boiler scale trouble.
3. Labor cost cut by elimination of firemen and woodcutters.
4. Electric plant is always ready and power is uniform, which is not the case with steam.
5. Personal equation of operator is reduced in importance. It takes a more skilled man to get the output and keep it up, on the donkey.
6. Higher speeds possible.
7. No water required. In some districts water for the donkey boiler has to be carried for miles.

The Field For Electrification

The majority of lumbermen who have seen electrified outfits at work are enthusiastic about this form of motive power. It is claimed that before long electric logging will receive official recognition because of the anxiety of governments to prevent forest fires.

The convincing argument is, of course, the fact that it costs less, output is increased, and lumbermen are willing to listen to arguments of this kind.

Canada has over 2,500 sawmills and there is some kind of logging outfit feeding nearly every one of them. The total capital invested in the lumber industry amounts to about $235,000,000, making it one of Canada's greatest industries. The adoption of electric drive wherever possible, is a feasible thing, one worth working for and easily capable of accomplishment, if lumbermen are shown what electricity will do for them.

The photograph herewith illustrates the skyline system of logging. The cable running to the distant hilltop is seen slanting away to the side of the photograph. Operations in this particular section are conducted on a large scale—some idea of the size of the work may be gained by comparing the men shown with the anchor tree. The huge logs shown in the photograph are all brought in, in this way. When it is considered that these are brought n at varying speeds up to 1,000 feet per minute (depending on the size of the logs) it is obvious that none but the stoutest and sturdiest apparatus can be used.

I'm Coming, Charlie!

This is the Only Possible Answer to the Invitations Being Broad-casted by the Big Convention Committee—Either be on Hand or Wire "I'm a Dead One"

The convention of Contractors and Dealers to be held in the King Edward Hotel, Toronto, on Monday and Tuesday, November 13 and 14 is an event you will long hold in your memory.

If you attend it.

If you don't attend, you will miss a lot of good merchandising ideas, to say nothing of the pleasure of meeting your friends. In that case, too, the strenuous work of the committee in charge, many of whom are giving practically their whole time to the preparation of the program, will have been in vain.

From this double viewpoint, then, we all owe it to this hard working committee, to the electrical industry and to ourselves to keep November 13 and 14 absolutely free.

"What is this wonderful program?", you say.

Well, it will aim at the root of our weakness.

The basic idea will be to teach the lesson of Better Merchandising. Hand-picked salesmen will demonstrate the most effective method of convincing skeptical customers that they should have this or that electrical appliance in their homes. This part of the program is already being rehearsed and some five or six model sales contests, are assured. The ideas contained in these demonstrations will constitute a valuable education for the man whose business it is to sell over the counter.

Then, it is planned to stage a most interesting play which portrays the daily life and habits of the electric merchant who has not yet caught the spirit of expert merchandising. The play shows the gradual evolution of this man until finally he emerges a real up-to-date successful merchant—a credit to the industry and a satisfaction to himself.

Also there will be papers and addresses. These, however, will be few and short, but there will be discussions aplenty. W. L. Goodwin will be in attendance. One of the biggest retail merchants in Canada will tell us the secrets of his own success. There will be a fine get-together banquet and a big dance. The King Edward assembly room is ideal for both. Sam. Hibben will demonstrate "Good Lighting."

Do we not owe it to the boys who are behind this convention to give them our support by attending the meetings and making our voices heard in the discussions?

A prominent educationalist in a recent platform address was outlining the qualifications of "a man":

It was not wealth.

It was not education.

It was not brains.

It was, rather, he who recognized his duty to the other fellows who were working toward the same ends as himself—public spirit, rather than private selfish interest.

Let us show Charlie Hopper and his committee of workers on November 13 and 14—and in the interval too—that there are a lot of "men" in the electrical industry.

BETTER MERCHANDISING

Let's Show Them

Christmas will be with us in about seven weeks.

The Christmas buying of electrical goods will begin in less than a month. Will you be ready?

Have you ordered your Christmas stocks?

Have you laid plans for getting in touch with your customers:—

By newspaper advertisements?

By letters?

By telephone?

By window displays?

By demonstrations?

By personal calls?

Do you realize:

That the hardware store, the furniture store and the drug store, are all working over time to grab the electrical business away from you?

This business is **naturally and logically—but not necessarily—yours.**

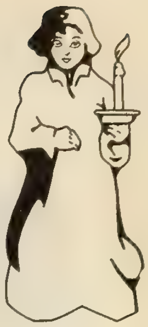
It will go to the merchant who makes the keenest effort.

Are we, in the electrical industry, going to sit down and watch our more aggressive competitors take the very food out of our mouths?

All-together—for the biggest Christmas effort yet.

Let's show the other trades that we're fast learning "How to Merchandise".

Results Follow Aggressive Methods of Pushing Christmas Goods



Methods That Resourceful Dealers Have Followed When Trying for More Holiday Business—Publicity the Needed Tonic—Windows Must be "Christmassy"

You don't have to spend a mint of money to get a lot of publicity for your Christmas campaign. The resourceful dealer will find ways and means of getting the attention of the public that cost very little.

To begin with, there are plenty of free helps available. Take window display material for example. This is generally good stuff and it pays the dealer to use it. Co-operate with the manufacturer as much as possible. It is a common occurrence to find the window display helps neglected under the counter,—perhaps they didn't just fit in when they came in, or the dealer was too busy to set them up—and we find a real sales help turned into a dead loss.

One ingenious electrical merchant hit upon the idea of having a good quality rubber stamp made bearing the words "Make it an Electrical Christmas—Buy Electrical Gifts at Jones' Store." This he stamped upon every piece of consumer electrical literature he could get his hands on, whether it was booklets describing washing machines, or letters setting forth the merits of vacuum cleaners or electric range literature, it was all one to him. At any rate he got enough together that he was able to put one in every house in his neighborhood. It is hard to estimate exactly what the effect of such publicity is, but it is certain that it directs the eyes of the public towards Jones' store as a medium for purchasing Christmas gifts.

In some of the smaller places the old stunt of colored lantern slides in the cinema theatres can be worked to good advantage. It pays to have the slides well made, and they should have a Christmas atmosphere. One slide that looked very well last year showed a conventional Santa Claus with the wording "The Bon-Ton Electrical Store—Headquarters for Electrical Gifts—The best Christmas Presents—See Our Special Display."

One live dealer hit upon the plan of using a small Christmas tree in his delivery truck. This truck is also used for wiring jobs, and wherever it goes through the city, it carries the tree with a sign attached to it, telling the Christmas buyers where to get the best Christmas presents. This device has attracted a good deal of attention and this dealer says that many of his customers remark on the novelty of the device.

Another good plan is to offer some electrical gift as a prize among school children for the best essay or oration on "Why Electrical Devices are the Best Christmas Presents." This plan requires a good deal of working up, the securing of competent judges, and altogether the expenditure of some time and money. It is worth while if properly carried out.

A word in regard to Christmas windows. It is well to get away altogether from the type of window you have been using all year. Give the display a Christmas atmosphere at all costs. There are some good window types shown elsewhere in this issue, that you can adapt to your particular needs. The display of a variety of articles is desirable at this time, and it is a catchy idea to use a card with each, lettered "For Father", "For Mother", and so on, right through the whole list you have available. Fireplaces, Christmas trees and so on are easily placed in the window and there is a great deal of difference between the effect produced by a cold, warehouse type of window, and the warm, Christmassy type that shows a Christmas spirit.

Christmas

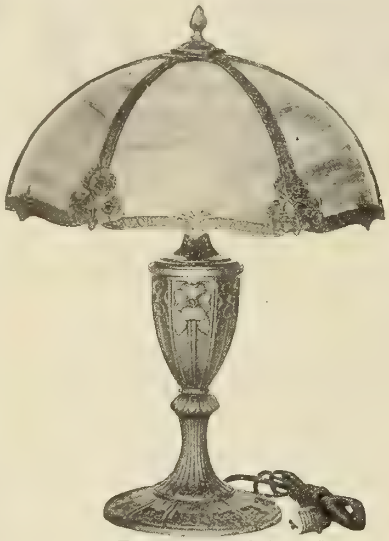
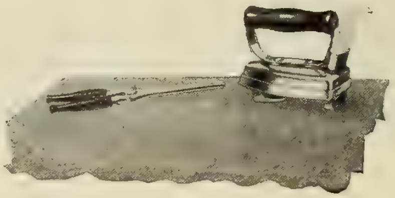
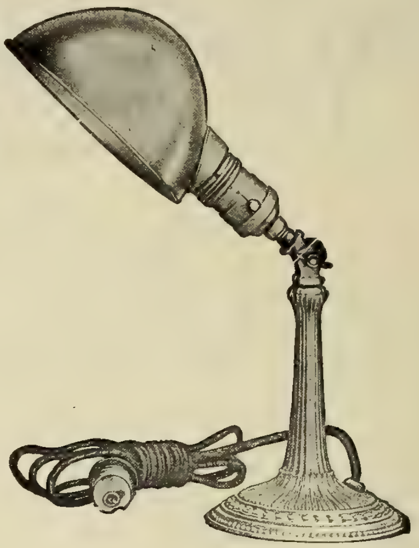


Table Lamp—C.G.E. Co.


Iron and Tongs Heater


Utility Lamp—C.G.E. Co.

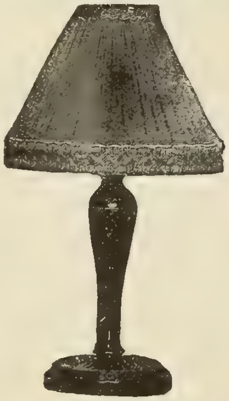
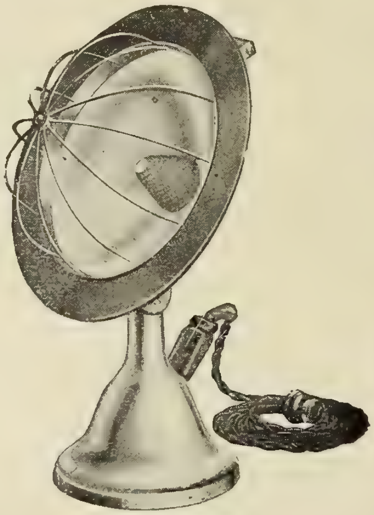
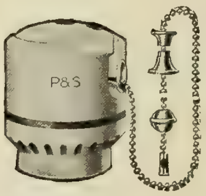
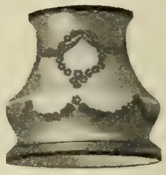


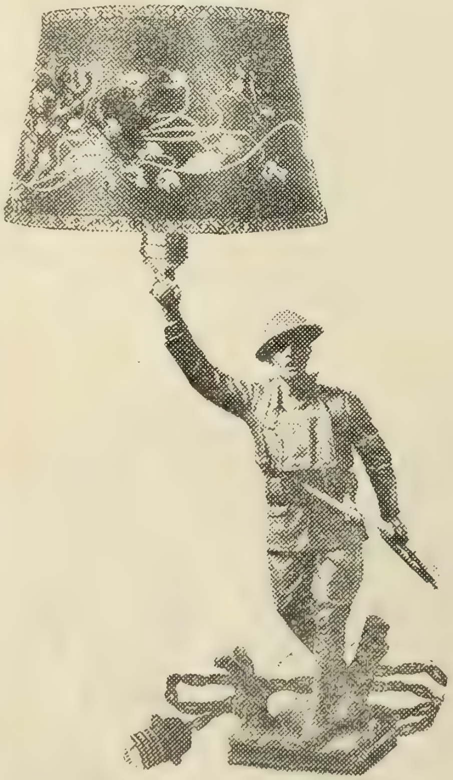
Table Lamp—Northern Electric Co.

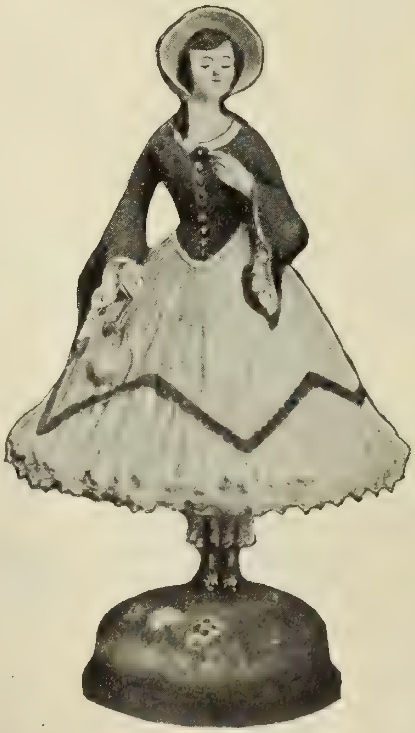

National Air Heater

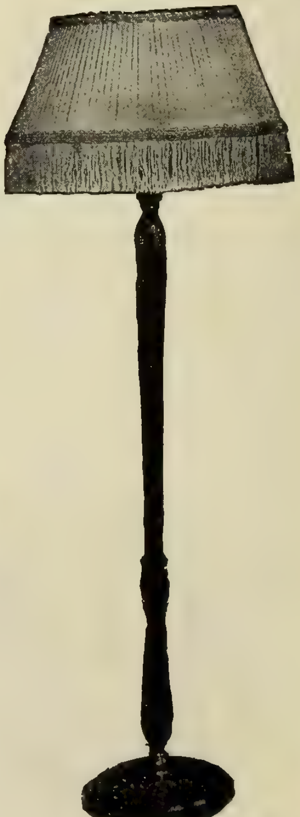


Ceiling Light Receptacle—Pass & Seymour Inc.


Bedroom Shade


Art Lamp American Doughboy

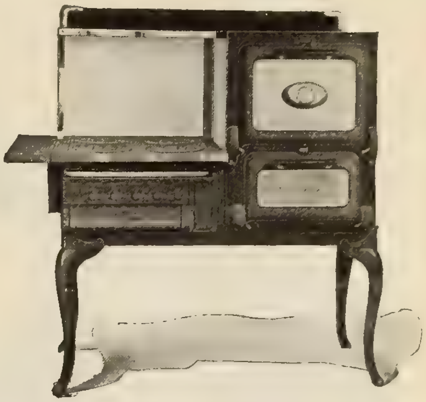

Perfume Lamp—Fulper Pottery


Floor Lamp—Northern Electric Co.

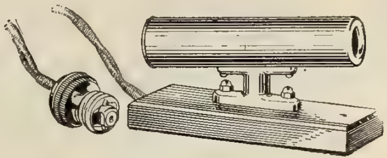
Christmas

Table Lamp

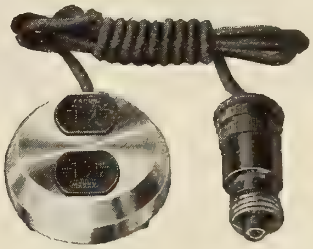
Waffle Iron—
Majestic Electric Development Co.



Electric Range—Westinghouse Co.

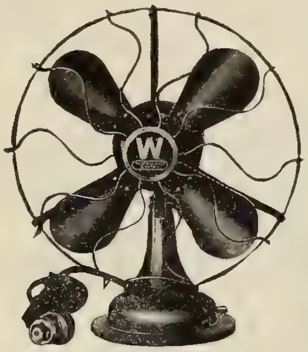


Curling Iron Heater—
Opal Electric & Mfg. Co.



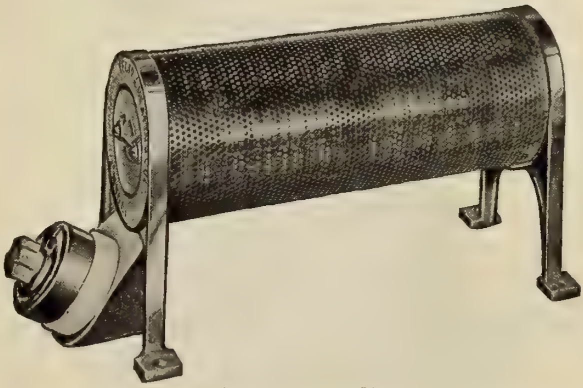
Duplex Table Outlet—
Arrow Electric Co.

Percolator—Westinghouse Mfg. Co.



Electric Fan—Westinghouse Co.

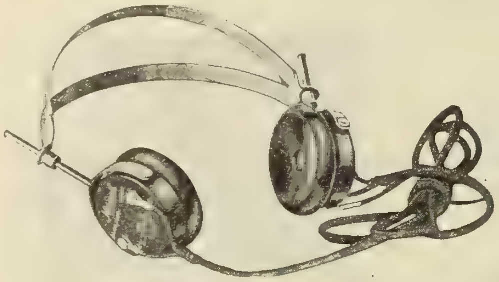
Chafing Dish



Heater—National Electric Heating Co.

Electric Floor Waxer—Canadian Floor Waxer & Polisher Co.

Christmas

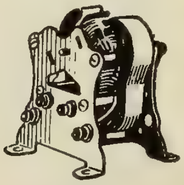


Headset—National Electric Heating Co.

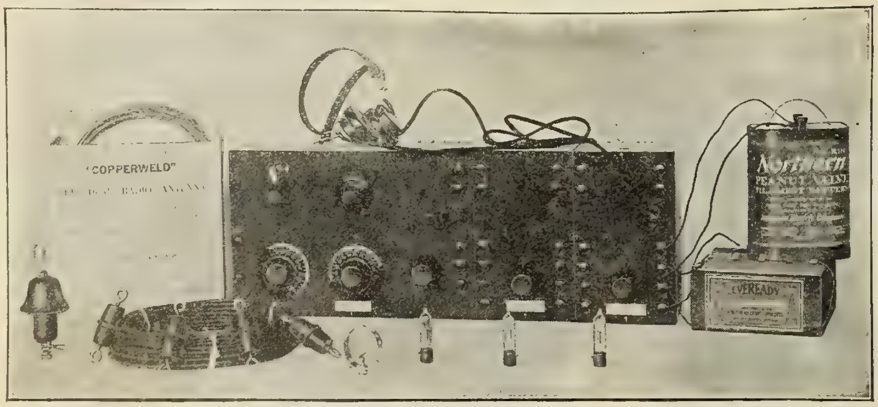
Flashing Plug—
Betts & Betts

Loud Speaker—Northern Electric Co.

Kellogg Molded Tube Socket

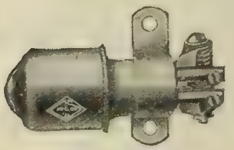


Toy Motor—
Gilbert-Menzies Co

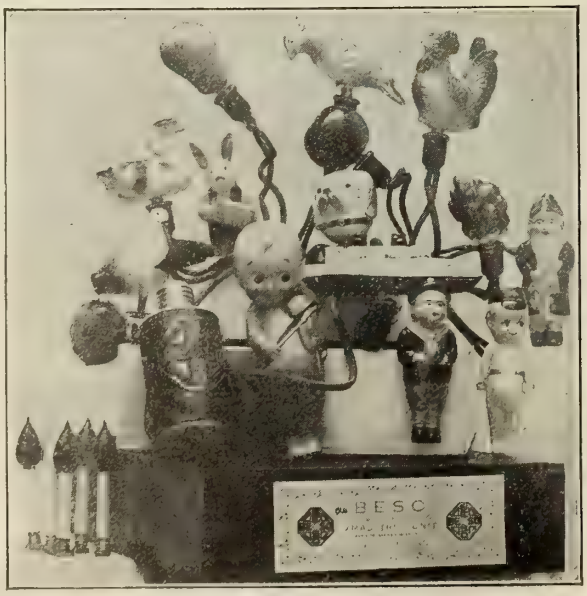


Northern Electric Receiving Set

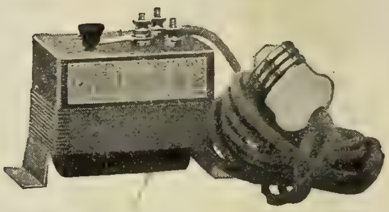
Hair Dryer—
Hamilton Beach Mfg. Co.



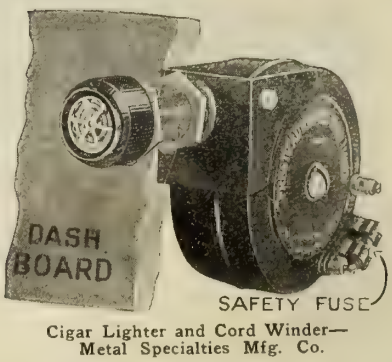
Pilot Lamp—
Culver Stearns Mfg. Co.



Betts & Betts Christmas Tree Unit

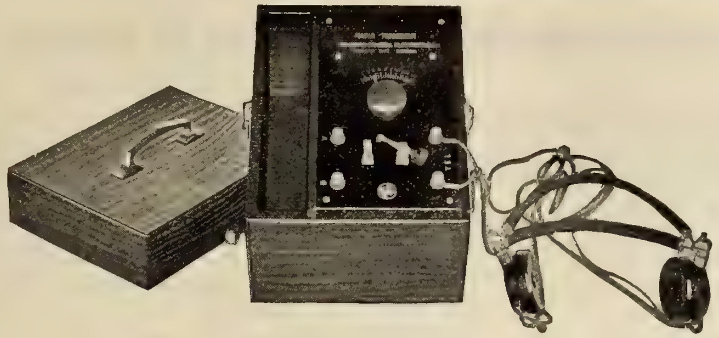


Vim Toy Transformer—Betts & Betts



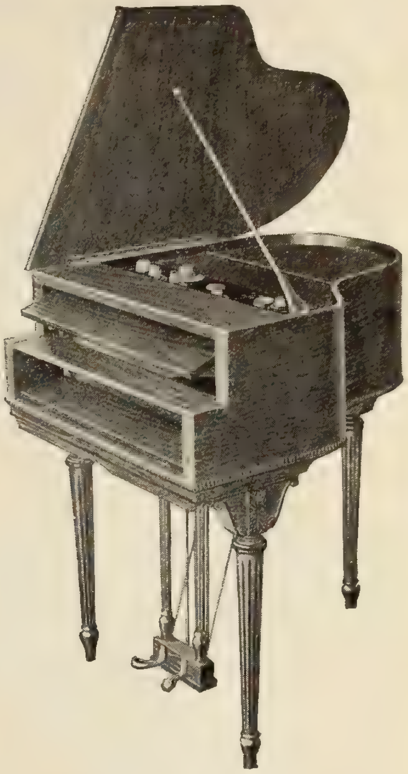
Cigar Lighter and Cord Winder—
Metal Specialties Mfg. Co.

Christmas

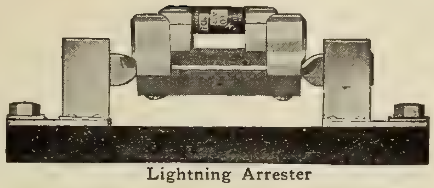


Radio Set—C.G.E. Co.

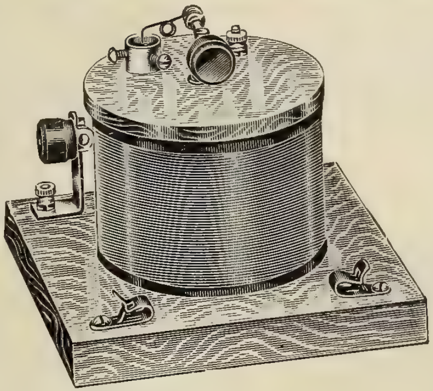
Gilbert Menzies Receiving Set



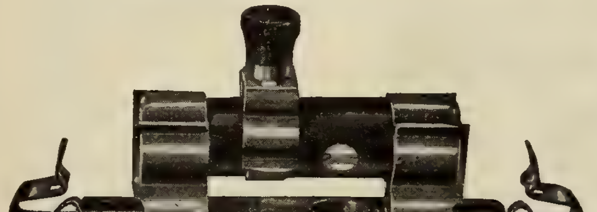
A Novel Receiving Set



Lightning Arrester



Rittenhouse Crystal Set



Arrestor—Fernando C. Mesa Co.

Cabinet Receiving Set

A list of Electrical Items suitable for Christmas Presents for every member of every family

General Servants in the Home

Two-way socket
Candle socket
Electric heating pad
Bell ringer
Bath heater
Cereal cooker
Casserole
Chafing dish
Chocolate and cream warmer
Electric churn
Clothes drier
Clothes washer
Coffee grinder
Coffee percolator
Combination cooker
Corn popper
Cream whipper
Dish washer
Disc stove—one element
Disc stove—two elements
Drink mixer
Egg boiler, cooker or steamer
Electrically heated blanket
Egg tester
Electrically heated faucet
Fan
Fireless cooker
Food warmer
Fruit and vegetable peeler
Frying pan
Fumigator
Gas lighter
Griddle
Hand lamp
Hot closet
Hot plate
Ice cream freezer
Illuminated porch number
Immersion electric heater
Iron
Ironing machine
Lemon squeezer
Meat chopper
Meat slicer
Milk warmer
Plate warmer
Radiator
Range or stove
Refrigerator
Regulating lamp or socket
Sauce pan
Wired serving table
Sewing machine motor
Sewing machine portable lamp
Stew pan
Sterilizer
Table cooking set
Table lamp
Tea ball pot, kettle or urn
Tea wagon, electrically fitted
Toaster
Toaster-stove
Utility motor
Vacuum cleaner
Waffle iron
Water purifier
Water heater
Water kettles
Wired dining table and other furniture
Appliance cord suspender
Isolated plant
Air heater
Electric grate
Candlestick adapters
Perfume burners
Luminous Pendants
Intercom. telephones
Samovar
Hair dryer
Electric clock systems
Electric fireless cookers
Floor lamps

Mostly for the Young People

Aeroplane
Automobile
Circuit breaker
Crane and hoist
Dynamo
Electric boat
Electric engine
Electric range
Fan
Ferris wheel
Utility motor
Hydro-electric generator
Lamp post
Electric locomotive
Motor and countershaft
Power station
Electric railway outfit
Steam engine and dynamo
Telephone
Toy magneto
Electric train
Transformer
Trolley car
Books on electricity
Picture and post card projector
Motion picture machine
Shock coil
Battery
Battery lantern
Flashlight
Electric fountains
Pistol flashlight
Bicycle light
Canoe lamp
Electric candle
Christmas tree lighting outfit
Bird, fruit and nut lamps
Miniature incandescent lamps
Electric scarfpin
Battery fan
Horseshoe magnet
Magnet charger
Telegraph instrument
Baby flatiron
Nursery light
Toy washing machine

Radio Accessories

Indoor aerials
Insulators
Amplifying transformers
Charging outfits
Crystal detectors
Phone condensers
Lightning arresters
Antenna wire
Ground switches
Loud speakers
Rheostats
Head sets
Tuning coils
Vacuum tubes
Complete sets
Variocouplers

A feature of Electric goods, often overlooked, is that they are used every day in the year

Electric Conveniences and Luxuries

Alarm clock
Battery lantern
Bed lamp
Burglar alarm
Candlestick
Chair lamp
Cigar lighter
Comb and curling ironer
Curling iron
Curling iron heater
Desk companion
Desk fan
Desk lamp
Electric fountain
Electric humidifier
Electrically lighted wall mirror
Electrically lighted table clock
Floral decorations
Flower basket
Foot warmer
Hair drier
Hair waver
Hand lantern
Heating pad
Hearing devices
Floor lamp
Illuminated pads and pencils
Illuminated table ornament
Library lamp
Lighted aquarium
Luminous switch plate
Massage vibrator
Novelty electric candle
Oil lamp attachment
Lamp shades
Piano lamp
Portable radiant heater
Reading lamp
Reed or wicker portable
Reminder clock
Illuminated shaving mirror
Shaving mug
Shaving water heater
Silk lamp shade
Talking machine motor
Traveler's iron
Traveler's companion
Traveler's stove
Traveler's lamp, cord and plug
Vest pocket flashlight
Watch case flashlight
Writing desk lamp

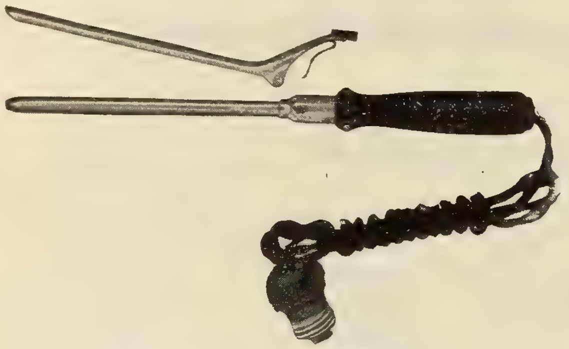
Invalid and Sick Room Comforts

Bath cabinet
Bed lamp
Body, joint and limb bakers
Candle or night light
Deodorizer
Ceiling clock
Electrically heated blanket
Electrically heated cap
Electrically heated garment
Electrically heated pillow
Foot warmer
Heating device
Heating pad
Medical battery
Medical coil
Medicator
Milk bottle and food warmer
Motor chair
Nurse signal
Obesity apparatus
Sterilizer
Therapeutic lamp
Treatment apparatus
Vibrator
Violet Ray apparatus

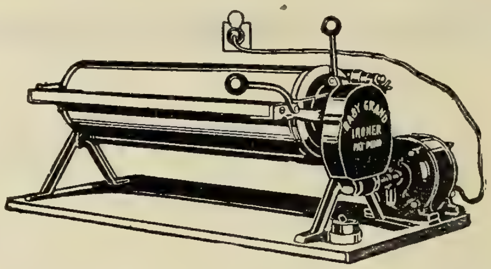
Electric Automobile Fittings

Battery lamp
Clock
Foot warmer
Lamp kit
Signal bell
Signal lights
Trouble lamp
Cigar and pipe lighter
Electric horn
Electrically heated gloves
Engine and radiator heater
Garage and tire pumps
Garage portable lamp
Headlight dimmer
Headlight glare diffuser
Headlight voltage regulator
Hydrometer for battery testing
Inspection lamp and magnet
Limousine annunciator
Limousine cluster light
Limousine telephone
Limousine radiator
Pocket testing meter
Signal gloves
Spark plug
Spark plug intensifier
Spark plug tester
Steering wheel warmer
Spotlight
Storage battery
Storage battery tester
Vulcanizer

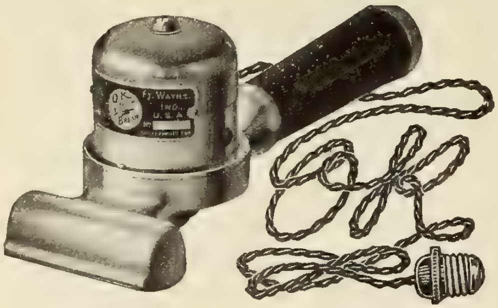
Christmas



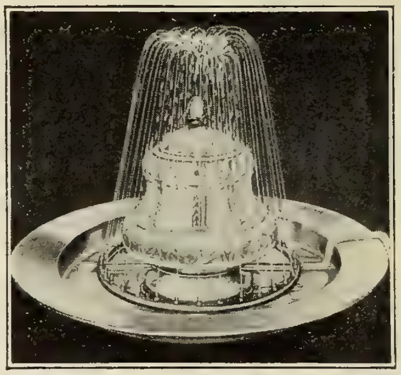
Curling Iron—Northern Electric Co.



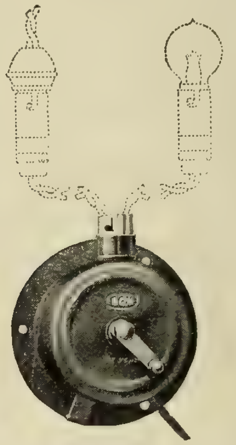
Electrically Heated Ironer—Ingersoll Machine & Tool



Hand Vacuum Cleaner—Wayne Machinery Co.

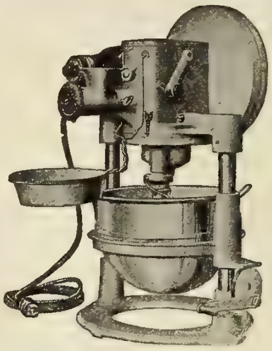


Humidifier-Ingersoll Electric Products Co

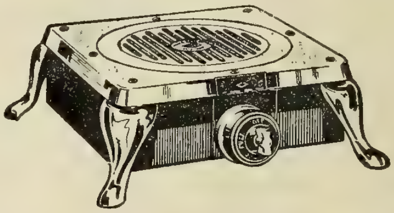


Trouble light—Grigsby Grunow-Hinds Co.

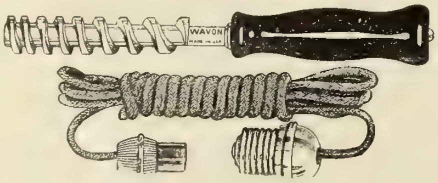
Heating Pad—Ingersoll Electric Products Co.



Mixonette—Read Machinery Co

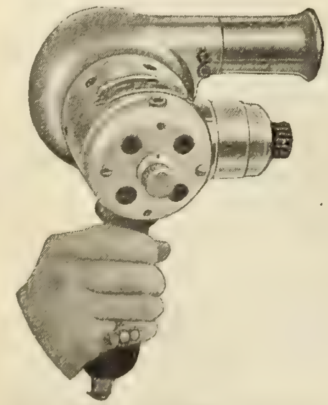


Utility Heater—C.G.E. Co.

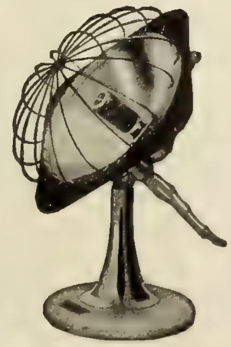


Wavon—Frank W. Morse Co.

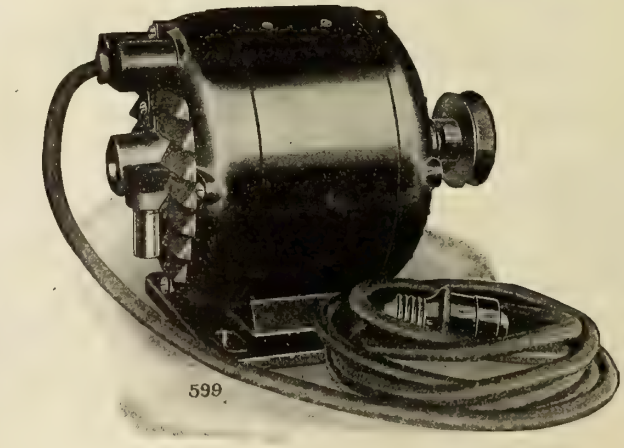
Eveready Flashlight



Hair Dryer—Wisconsin Electric Co.



Air Heater—C.G.E. Co.



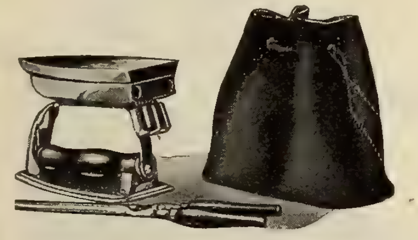
Robbins & Myers Utility Motors

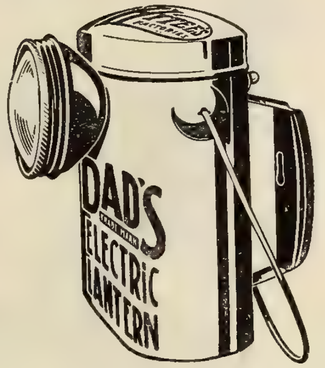
Christmas

Acousticon—Dictograph Product Corp.

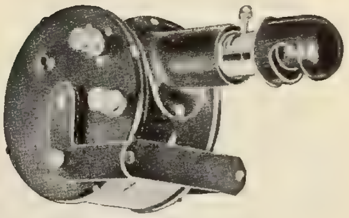
C.G.E. Co.—Percolator

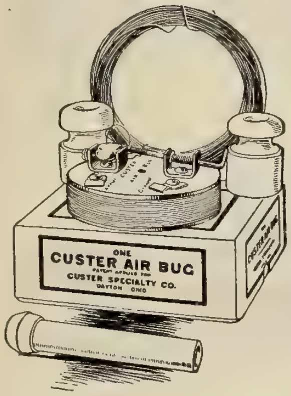
Art Lamp—Fulper Pottery


Travelling Outfit—C.G.E. Co.

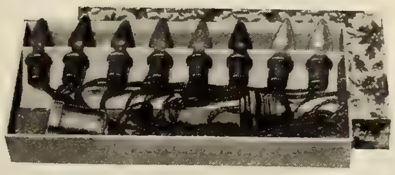


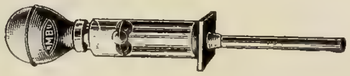
Portable Lantern—Dad's Factories

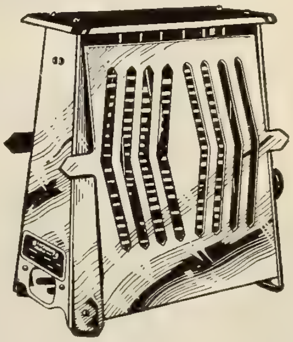

Trouble Finder—
Cincinnati Specialty Mfg. Co.



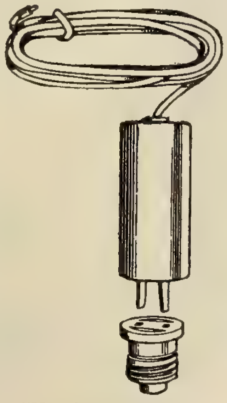
Radio Set—Custer Specialty Co.

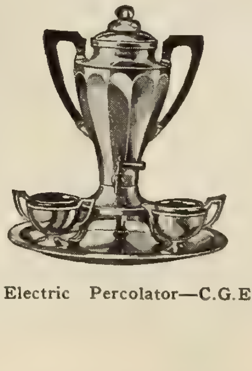

Christmas Tree Lights—C.G.E. Co.

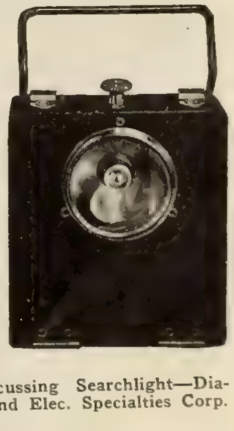

Battery Tester—
American Bureau of Engineering


Toaster

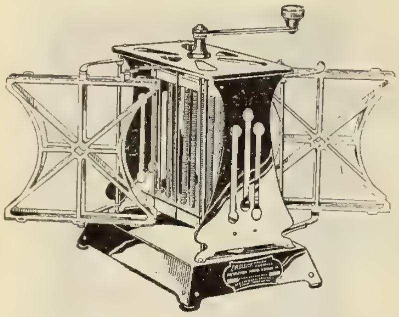
Bicycle Light—Dad's Factories.


"No Aerial" Plug—
F. E. Garrett Co.

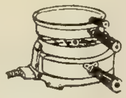

Electric Percolator—C.G.E.


Focussing Searchlight—Diamond Elec. Specialties Corp.

Christmas

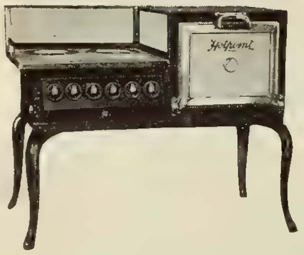


Toaster—Perfection Elec. Products Corp.



Electric Grill

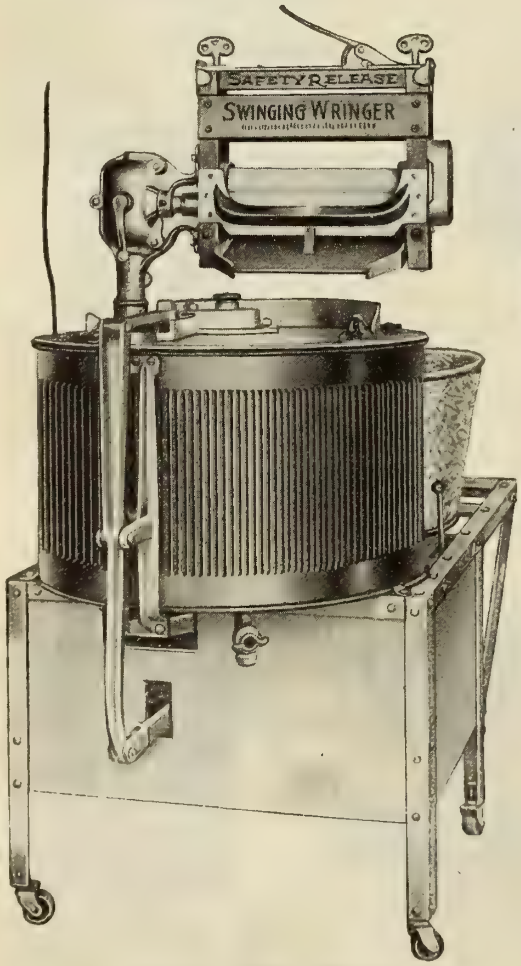
Whipping Machine—Racine Universal Motor Co.



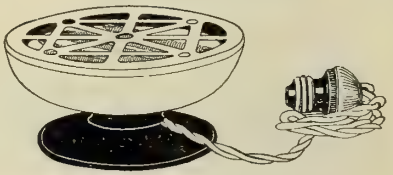
Electric Range—C.G.E. Co.

Vacuum Cleaner

Wired Table—Nichols Electric Furniture Co.

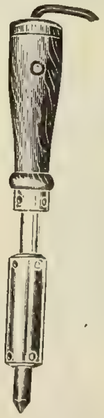


Electric Iron—C.G.E. Co.



Hot Plate—Central Flatiron Mfg. Co.

Electric Washing Machine

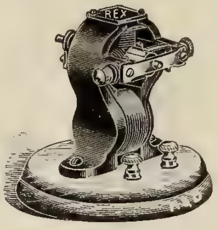


Soldering Iron

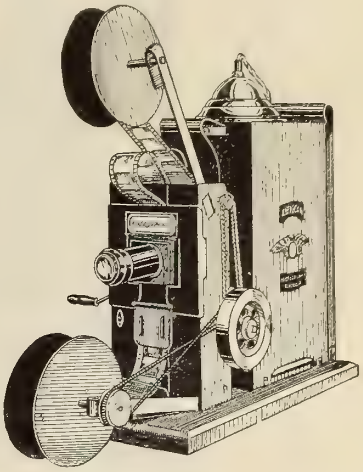
Portable Lamp

Christmas

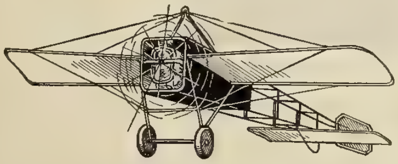
Phono-Set—Gilbert Menzies Co.



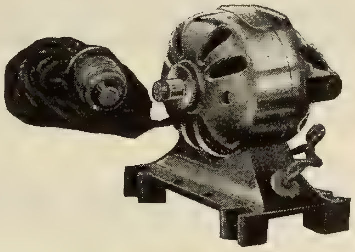
Motor—
Kendrick & Davis Co.

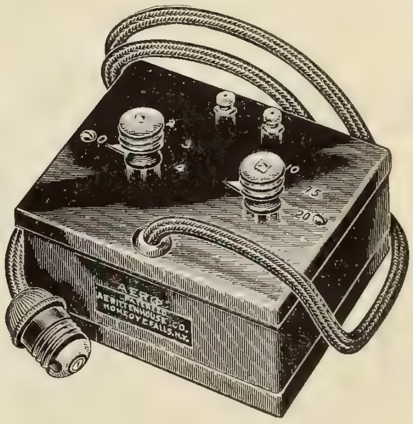


American Pictograph Co.

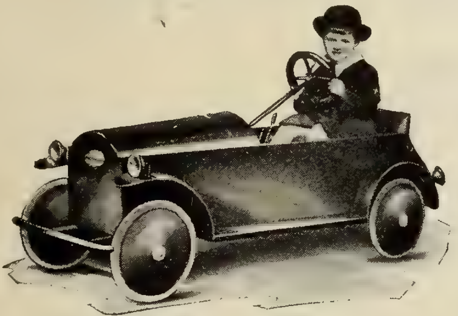


Rittenhouse Aeroplane

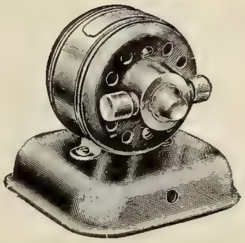




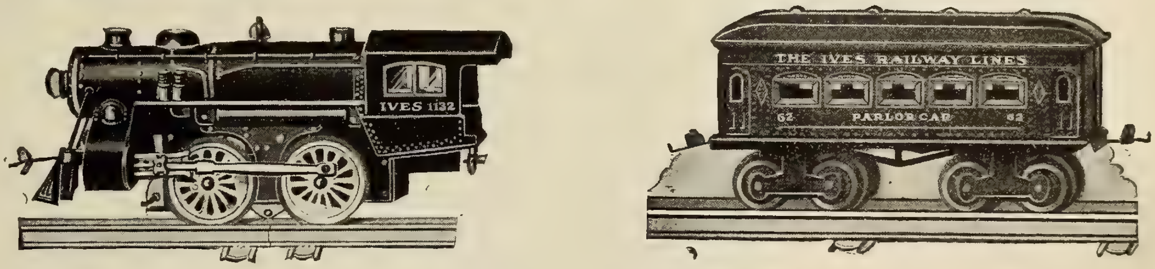
Rittenhouse Transformer



Custer Cootie Car

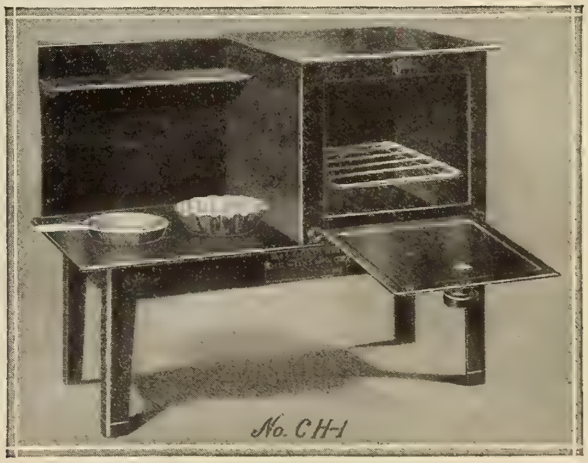


Motor—Gilbert-Menzies Co.



Electric Trains—A. C. Gilbert Menzies Co.

Perfume Lamp—Fulper Pottery



Toy Range—H. G. Wells Mfg. Co.

Cinderella Up-to-Date

Creating Electric Christmas Atmosphere

Here is an Attractive Little Play, Especially for the Young, That May Well be Made a Feature in School or Church Christmas Entertainments*

THIS pantomime has been written for the use of central stations, electrical leagues, electrical shows, electrical conventions, manufacturers, or retailers, as a picturesque demonstration of the standard electrical household appliances.

The cost of production will be small, considering that manufacturers, jobbers and others will in all probability combine and appropriate advertising funds to the financing of the show.

It is suggested that this pantomime adapted from the story by the Grimm Brothers, be played by very small children actors. The first purpose in using children is to show how simply and easily the electric household utilities used as properties may be operated. Then children actors are so much more natural, in the majority of cases, than grown ups; they subordinate themselves more readily, and make a fresher and so a stronger appeal to jaded audiences.

The combination of the third oldest fairy tale in the world, with the display of modern electric devices, which only a short time ago were marvels to the most blase among us, makes a study of comparison and invests each the other with romance. The object of the producer is to keep the romance and accentuate the magic of electric service.

There are only two stage sets used in the pantomime. They are In the Kitchen of Cinderella's House and On the Grand Staircase of the Palace. Both sets are used twice. In the former set the walls of the kitchen should be made to represent old panels, and arranged so that certain panels may swing or slide open and shut at the touching of electric buttons, to reveal the electric appliances working busily behind them. Double walls are of course used in this set, between which the electric machines are placed. The smallest models of the machines should be used. They include an electric range, a washing machine with wringer, an electric iron, an electric dishwasher, an electric cleaner and a phonograph.

A suggestion is that merchants might have their advertisements thrown by lantern slides upon screens at either side of the stage. while products are being introduced and demonstrated in the play.

A production committee would consist of a business director, an advertising director, the play director or coach, a stage manager, a property man, a costumer, and above all an electrical director.

The duties of the producing committee are these:

The Director is a responsible head; someone preferably who knows something about theatrical work. This director must be blessed with some imagination, that he or she may discover and direct the imagination of collaborators and actors. The director in Cinderella's House may very well be a woman; it must be someone capable of assembling and casting the actors in their parts. This director, with the electrical man, must determine where the principle lighting must come from. In the second scene, the grand staircase, an elaborate display of lighting effects may be made. It would also be more effective in the third scene to have this set in darkness, when Cinderella is changed back to her rags; using a spot light on her. Orchestrated phonograph music will be necessary in these scenes.

Stage manager and property man may be

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*Courtesy Society for Electrical Development.

combined in one person if necessary; but the greater the number of persons concerned in an amateur production, the greater the interest aroused.

The stage manager is responsible for the stage being properly set; for the actors being at their entrances on time.

The property man must see that everything used in the pantomime is in its place. In this instance, he must work in co-operation with the electrical director.

The electrical director must be a practical electrician, who will see that electrical properties are in working condition; that all electrical installations are perfectly made; that every switch and every outlet and every appliance is in the most exquisitely perfect order. There must be no failures in this equipment.

The costumer will design and superintend the making of costumes. In the ballroom scene there is ample opportunity for some beautiful effects.

The business director will manage the financing of the production; the expenditures of money for all purposes.

The advertising manager will see that the show obtains all possible advertising. He may appoint if desired a director of publicity, who will handle the stories to be written for local newspapers; the announcements made through organizations such as womens' clubs, etc. This publicity director may call personally upon newspaper editors, announcing the preparation of the production, giving names of people back of its production, the names of those doing the actual work, of the children taking part. Editors will then signify whether stories of the show are to be written by the publicity director personally or whether reporters will be assigned to cover the work. It is always safe however, to get continuous information into the hands of editors; each new development or occurrence of interest in the preparation of the show may be made into interesting newspaper stories, which all help to swell the advertising your production is obtaining. Pictures of actors, in costume if possible, should accompany these stories.

The effects of this picture on the future audiences must be kept carefully in mind throughout the work of preparation. Remember this audience consists of the people you wish to convince of the charm and utility of doing it electrically.

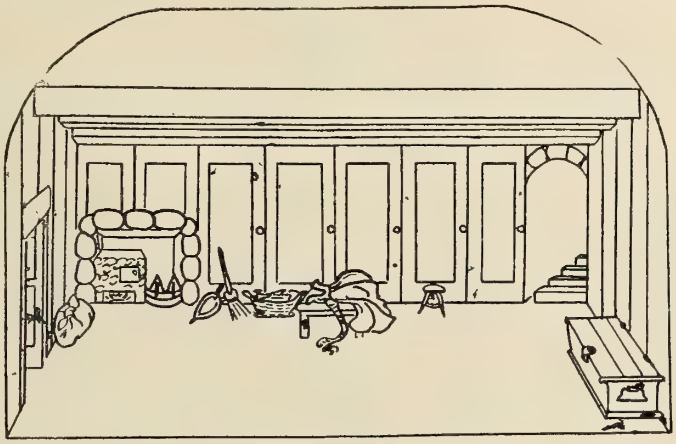
SCENARIO OF THE PANTOMIME

Act I, Ssene I

In the Kitchen of Cinderella's House

THE walls of this old-time kitchen are dingy oak panels and the floor of worn stone. Like most old English kitchens. this seems to be the living room of a poor family. At the back (right) is a great open fireplace, with electric logs, and a stone oven which food is cooking in kettles. The logs are but smouldering, and among the ashes scattered in disorder on the hearth are two great flatirons, too heavy for the small drudge Cinderella who is struggling back and forth to her sisters' finery which is arranged upon the table. The only other article of furniture in the room beside the table and two stools is an old chest in a corner.

Cinderella is barefooted and ragged and drags her feet wearily as she walks to and fro with the irons. She must frequently resort to the ancient pair of bellows on the hearth to fan the flame of the logs into action. In the back wall (left) is a closed door that leads by two steps to the other part of the house.



1. The Kitchen of Cinderella's House

Pots and pans and dirty crockery are scattered about and there is a bundle of soiled linen among the chaos.

Cinderella scorches the finery she is pressing. She appears frightened at her misfortune and weeps. She then attempts to remedy the scorch by rubbing it with a wet cloth.

The two Haughty Sisters enter from the house door. They are in a great flutter over their preparations to attend the great ball and express their anticipated grandeur to each other, growing quite excited and jealous at the explanation of the different toilettes. Looking about they show their disgust at the disorderly kitchen and begin to jerk Cinderella about, point to the soiled linen and utensils, and threaten her. They examine their finery. The eldest sister discovers the scorch and slaps Cinderella, who runs and falls among the ashes weeping.

The sisters go out into the house with their finery. The room grows dark. The light from the electric logs slowly grows brighter and the Fairy steps from out the flame. Her wand is tipped with an electric radiance. Cinderella falls back, watching the Fairy in amazement.

The Fairy lifts the little girl, comforts her tenderly and escorts her about the room, showing her magic spots upon the walls which she creates by a touch of her wand. She explains in dumb show how Cinderella may operate their magic power when she has use for them.

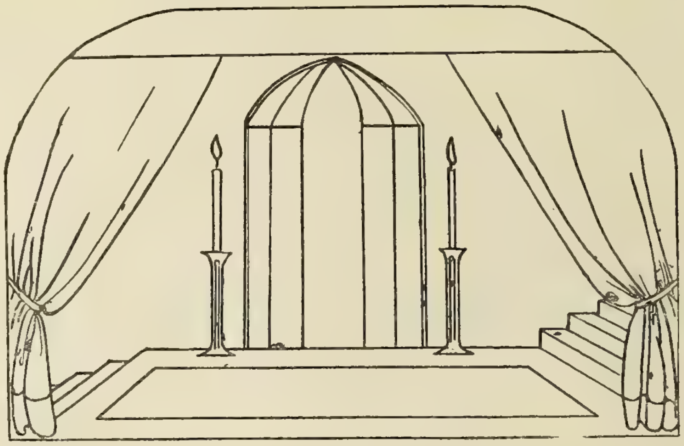
The Fairy disappears.

Cinderella rubs her eyes and pinches herself to see if she is dreaming. She creeps to the door through which her sisters have disappeared and listening a bit to see if they are engrossed in their dressing, she does the door softly and presses the first button the Fairy has shown her. The walls swing open, revealing an electric stove. She places the food from the stone oven on the electric stove and soon it is steaming away merrily. She closes it into the wall and pressing the second button brings out an electric washing-machine, with its attachments, into which she tumbles the soiled linen, closing it up into the wall again. A third button brings out an electric dishwasher in which she arranges the dirty crockery and pans, closing it back again to do its work. A fourth button brings out a vacuum cleaner with which she cleans the room, placing it in the wall again when she has used it. She then arranges the clean dishes from the dishwasher upon the table and passes the snowy linen from the washing machine, through the wringer into a laundry-basket. She places the food from the electric stove in the dishes on the table. Bringing the laundry basket of nicely washed linen out into the kitchen, she closes all the magic closets of the wall up again.

The Haughty Sisters enter and are astonished at the shining brightness of the clean kitchen and the basket of laundry. They are too much interested in themselves, however, to think of anything else very long. They preen themselves in their ball room finery, while they gulp down their food. With admonition to Cinderella to stay at home and mind the house they disappear out the entrance door.

Cinderella gazes wistfully after the departing sisters and then goes slowly to her laundry basket of snowy linen. A fifth button pressed brings out the ironing-board and electric ironer, and Cinderella is soon busy pressing the linen.

Suddenly the little girl pauses in her interested movements and stands thinking. She runs to the old chest and pulls some old finery out and examines it. She begins pressing this garment with the smoothing iron and soon holds it out fresh and fluffy. With great excitement she dives into the chest again and produces a pair of shining slippers to match the frock, then disappearing into the next room reappears almost instantly dressed in her finery. She walks about the room looking closely at the spots her Fairy had touched, and discovers the sixth button. Pressing this she listens and is joyfully amazed to hear the low deep notes of a motor horn. A chauffeur in trig livery steps through the entrance door and appears before her magically. He touches his cap and stands as if awaiting orders. Cinderella runs to look out the door and then claps her hands for joy. She goes out followed by the chauffeur.



2. On the Grand Staircase of the Palace

(Curtain)

End of Act I, Scene I

Act II, Scene I

On the Grand Staircase of The Royal Palace

A LANDING of the grand staircase occupies the entire stage with steps ascending at the right and continuing at the left. At the back side of this landing a view of the ballroom is given through a large open window draped with vines and flowers and through which the dancers may be seen, floating by to the accompaniment of orchestrated music from phonographs.

Guests at the ball walk up the stairs sometimes pausing to chat in groups.

Cinderella enters from below and slowly ascends the stairs. She walks slowly to the middle of the landing. A little page runs before her and hastens up the stairs.

The guests on the landing watch Cinderella in wonder. The little page enters, tumbling down the stairs before the Prince, who expresses his admiration, bowing low before the mysterious stranger.

The Prince escorts Cinderella on up the stairs and out.

(Curtain)

End of Act II, Scene I

Act II, Scene II

The Same as Act II, Scene I

THE music still plays. The dancers still float by the window on the staircase. The stair itself is deserted.

Cinderella appears running down the stair and onto the landing. The Prince runs after her. They stop on the landing and he is beseeching her not to leave. She turns to speak to him. From somewhere bells chime the hours of twelve. There is a sudden flash of light and the scene is in darkness. When the lights go on again Cinderella in her old rags is seen flying down the stairs. The Prince stands staring in amazement. Other guests run down the stair onto the landing and point to the ragged girl disappearing in the darkness. The Prince stoops to pick up a little slipper left where his charmer had been standing and shows it to the others.

(Curtain)

End of Act II, Scene II

Act III, Scene I

In the Kitchen of Cinderella's House. The morning after the ball. The kitchen has an orderly aspect. In place of the oven the electric stove occupies the fireplace. In the place of the old table there is a new one, which is a case for a phonograph. The freshly pressed linen is lying in an orderly stack on the table; Cinderella enters from the house in a fresh house frock and glancing warily about to see if her sisters are near, appears much relieved and presses the button of the table phonograph. It begins to play a merry waltz and the little girl dances around to the music, touching the magic buttons and peeping into the secret closets where her electric wonders are concealed. Hearing her sisters approaching she shuts the music off and goes to sit on the hearth.

The sisters enter. They are much too excited by the happening of the mysterious stranger at the ball the night before, to notice the kitchen. They pay no attention to the little girl who takes the mate to the lost slipper from her pocket and looks at it sadly.

The eldest sister, going to the entrance door, calls her sister excitedly to note a crowd approaching the house.

A royal page enters and bowing before the sisters presents them with the royal decree pertaining to the search being made by the Prince for the owner of the slipper. The sisters nearly tear the parchment containing the decree to pieces in their efforts to see it first. Cinderella sits in her corner unobserved. The Page goes out and the sisters begin a dumb show altercation as to which one the slipper will fit and which has the smallest foot. They dispute with heads, hands and feet. They rush from the room into their dressing room, quarreling and gesticulating.

Cinderella listens at the door through which her sisters have disappeared, looking at her slipper. She slips it back into her pocket just as her eldest sister rushes back out the door, seizes her and drags her to the table, beneath which she thrusts her, pulling the laundry down around her. The eldest sister rushes out again. The Prince enters from the outside with several members of his court, followed by excited villagers. The Haughty Sisters return, dressed in their finery and give themselves great airs as they sit down to have the slipper the Prince is carrying, tried on their feet by the page. The slipper will fit neither one of the sisters and the eldest one, greatly disappointed, seizes a kitchen knife at hand and attempts to cut off her heels and toes in an effort to crown her foot into the slipper.

Suddenly mysterious music begins to sound from the table and a voice sings: **"You may cut off your heel and cut off your toes but under the table the slipper goes."**

The guests are startled, but the Prince insists upon investigation, and soon drags Cinderella out from beneath the table. The Prince tries the slipper upon Cinderella's foot, in spite of the rage of her sisters.

The slipper goes upon Cinderella's foot smoothly. She produces the mate to it from her pocket. The Prince falls to his knees and kisses her hand. The Haughty Sisters rush from the house in their jealous rage.

Cinderella goes about the kitchen, on the arm of the Prince showing the magicial machines that have so influenced her fate.

(Curtain)

End of Cinderella's House

Cinderella's House

A COMBINATION OF THE THIRD OLDEST
FAIRY TALE IN THE WORLD WITH A
SERVICEABLE DISPLAY OF MODERN
ELECTRICAL DEVICES STAGED
AND PRODUCED BY
*(here insert your name)**

IN THREE ACTS AND FOUR SCENES

Characters in Pantomime

CINDERELLA ....
The Fairy ....
The First Proud Sister ....
The Second Proud Sister ....
The Chauffeur ....
The Little Page ....
The Prince ....
Dancers at the Ball ....
Courtiers, attendants, villagers ....

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* A printed program on a small sheet of pink or blue paper announcing the Pantomime and giving the cast with the names of the children playing the different roles will help to stir up much interest in the production. On this announcement may go the names of the company, firm or organization staging the Pantomime and the names of the Committee, patrons, etc

Winnipeg Electrical Men Start Strong Campaign to Boost Electricity

The electrical men of Winnipeg are running two or three page electrical sections, regularly. These pages contain about five columns of advertising and three pages of editorial matter dealing with the advantages to be derived from the greater use of electricity. Each week features two or three lines only, for instance October the 7th issue dealt with ranges, air heaters, and water heaters; October the 14th with washing machines, electric grates, and commercial illumination; October 21st with ranges, table appliances and air heaters, and October 28th with residental illumination. A committee has been formed comprising Messrs. Deering, Howard, and King, who have taken charge of the section.

In order to arouse interest in these pages, the Winnipeg Electrical Contractor-dealers' Association have offered $500.00 in electrical appliances for a slogan that will express the objects and service of their association. The prizes offered are as follows:

1st prize....Westinghouse electric range. installed in home.
2nd prize....Community electric washer.
3rd prize....Northern electric radio set.
4th prize....Hot Point electric table set.
5th prize....Universal electric vacuum cleaner.
6th prize....Moffat electric grate.
7th prize....Star water heater & wiring.
8th prize....Electric air heater.

The objects of the association are outlined in the advertising as follows:

1—To further the developments of the electrical industry in Manitoba.
2—To combine safety, convenience and reliability in the application of electricity to homes and commercial institutions.
3—To maintain a high standard of business ideals amongst electrical dealers.
4—To create a high standard of workmanship in electrical installations.
5—To give to the public the benefit of their experience in the latest developments of the electrical industry.
6—To place their guarantee behind all the goods they sell and the work they do.

The contest is open to anyone, and there is no limit to the number of slogans sent in; the contest closes at midnight December 23rd, 1922.

Both the Winnipeg contractor-dealers, and the Manitoba Electrical Association have voted a substantial sum of money to be used for advertising purposes, and these organizations will advertise alternate weeks, taking a quarter page or thereabouts every Saturday. In order to keep the advertisers posted as to what future issues will feature, a schedule for the next three months has been printed and distributed to the various electrical firms in Winnipeg; this card also shows the advertising rates.

The editorial matter in these sections is worthy of comment, as it is of a highly educative nature. The following are a few of the headings that appear in the Electrical Section:

Show Refinement in Room Lighting.
Application of Electric Heat in Industry.
Electric Water Heaters; High and Low Temperatures.
Electricity Blessing to Modern Woman.
Installation of Electric Outlets.
Health Value of Electric Washer.
Woman's Place is in the Electric Home.
Facts about Portable Heaters.
How One's Home should be Lighted.
Many Advantages to Electric Iron.
Important Points to be considered in purchasing of Electric Washer.
What the Winnipeg Electrical Contractor-Dealers Can Give.
Transferable Light Fixtures Featured.
Always Supply of Hot Water.
Getting Husbands to Wash Dishes.
Proud Boast of City House Owner.
Importance of Properly Lighted Show Windows as Lure for probable Buyers.

It is pleasing to state that the Winnipeg dealers are already beginning to trace direct results from their advertising; for the convenience of those advertisers who are not familiar with writing advertising copy, every assistance is given them by the committee.

In the advertising copy of the Electrical Contractor-dealers' Association, they give the names and addresses of all members of their association, and strongly advise the public to patronize the legitimate dealer, and not take chances on the irresponsible casual contractor as, if you do, nine times out of ten you are liable to have faulty work done and eventually find it necessary to call in the legitimate dealer and have the job done again. It is always cheapest in the long run to call in skilled help in the first place.

What Future Advertisements Will Feature

November 4th—Washing Machines, Ironing Machines and Water Heaters.
November 11th—Vacuum Cleaners and Radio.
November 18th—Ranges and Illumination, Commercial.
November 25th—Washing Machines, Radio and Table Appliances.
December 2nd—Telephone and Ranges.
December 9th—Illumination, Residential; Vacuum Cleaners and Water Heaters.
December 16th—Table Appliances and Ranges.
December 23rd—Vacuum Cleaners and Table Appliances.
December 30th—Table Appliances and Water Heaters.

The Baby Grand

The Baby Grand Ironer is finding a good field in Winnipeg, according to reports from Mr. F. E. Garrett. He states that the Winnipeg Hydro has created a great deal of interest through the efforts of Mr. W. T. King, publicity manager of the Hydro. One of the features of this ironer is that it does not require and special wiring; therefore there should be a good demand for it in the Prairie Provinces.

Contractor-Dealers' Convention, Toronto, Nov. 13 & 14

Royal Vacuum Cleaners

The Continental Electric Co. of Toronto, who are manufacturers of the Royal vacuum cleaner, are putting on a sales campaign at the present time in Western Canada, having sent a factory representative to Winnipeg, Regina, and Edmonton. Mr. Stark, general manager of the company recently made a trip through the West appointing agents in the principal towns. Mr. Fred E. Garrett who is representing this firm in the prairie provinces, reports business as being very good. The Sibbald Electric Co. Ltd., Winnipeg have been showing some very attractive window displays of this line.

Dinner in Honor of A. W. McLimont

On Wednesday the 11th October, the heads of departments in the Winnipeg Electric Railway Co., and the Manitoba Power Co., gave a dinner at the Royal Alexandra Hotel, Winnipeg, in honor of Mr. A. W. McLimont, vice-president and general manager of the two above named companies, the occasion being the celebrating of Mr. McLimont's fifth anniversary with the Winnipeg Electric Railway Co. Sixty five covers were laid for the dinner. Mr. John Whitsell, manager of the Winnipeg Electric Railway Co., acted as chairman. An elaborate programme had been prepared by Mr. H. C. Howard, publicity manager of the Winnipeg Electric Railway Co., and great credit is due him for his good work. It is unnecessary to say much about Mr. McLimont as every westerner in the electrical industry knows what has been accomplished by him during the past five years, how he has won the sympathy of the public, the goodwill of his employees, and the great strides that have been made under his direction in both the Winnipeg Electric Railway Co., and the Manitoba Power Co.

A. W. McLimont

The menu card was a very handsome, artistic production, the border illustrations weaving in the various activities of these two great companies. A fine photograph of the McLimont showing, in the background the big head office building adorns one of the pages.

H. W. Monahan Visits Winnipeg

H. W. Monahan, manager of the Electric Sales and Engineering Co., Fort William, Ont., was a recent visitor to Winnipeg, where he spent a few days on business matters. This company has just completed the street railway extension to Chippewa Park, on the north shore of Lake Superior, the trackage being 1 mile and a third long. Fares were collected just five weeks after the work was commenced. This is very rapid work, considering that the construction work was done under difficulties owing to the fact that a considerable portion of the laying of the track was through muskeg. A great deal of favorable comment has been heard ond Mr. Monahan, who supervised the work, is to be congratulated.

Harry Reid Changes Territory

Harry Reid, who is well-known to the electrical industry in Winnipeg, having been connected with the Great West Electric Co. for a number of years, it going to cover Western Ontario, Manitoba and Eastern Saskatchewan for the same firm.

City of Brandon Wants Hydro Power

Plans for the immediate gathering of further data in connection with power matters were discussed at a joint meeting of the city council, and the power committee of the Board of Trade, held in the City Hall, Brandon, on Friday evening Sept 22. As a result of the discussion on the subject of power negotiations, it was decided to invite Mr. J. G. Glassco, general manager of the Winnipeg Hydro-electric System, to visit Brandon within the next few weeks and to address another meeting of the City Council and the Board of Trade.

It was also recommended that invitations be extended at once to the Manitoba Power Company, and the Manitoba Power Commission to submit some plans or open negotiations with a view to obtaining cheaper power for the City of Brandon. If personal representations will be made by any of these parties, the City Council and Board of Trade will hold special meetings, and take up the matter with them.

Judging from the discussion the big question now is, whether it is to be hydro or steam power, though hydro appears to receive first consideration. It is stated that good inducements will be offered in the way of a franchise to the company offering the right kind of proposition that can be carried out. Mr. J. Rochetti, acting Power Commissioner for the Province of Manitoba will visit Brandon at the end of October and submit a proposition to the Council, and Board of Trade.

Contractor-Dealers' Convention, Toronto, Nov. 13 & 14

Steam Plant for Hanna, Alta.

The Municipality of Hanna, Alta., have recently placed a contract with the Canadian General Electric Company, Ltd., for the supply of one 125 kv.a., 514 r.p.m., 2,300 volt, three phase, 60 cycle generator with direct connected exciter; the same company will supply Goldie McCulloch high speed, vertical, forced lubrication engine and two Canadian Allis Chalmers boilers 72 by 18, 150 h.p. return tubular type, together with two steel smoke stacks 36 inch diameter, and 60 feet high. Further equipment by the same company includes a panel for the generator, a constant current street lighting transformer with control and a number of lightning arresters; also feed water boilers and deep well steam pumping equipment. This machinery will be installed by the Canadian General Electric Co., Ltd., who are co-operating with Haddin and Miles Ltd., consulting engineers, Calgary, Alta. In connection with the same piece of work, contract for the pole line construction has been let to E. Kelly; poles to Electrical Engineers Ltd.; building of power house to J. E. McFarlen, and drilling wells to P. O. Drynes. The total contract for plant and transmission will be approximately $35,000.

Winnipeg Hydro Issues Souvenir

The Winnipeg Hydro-electric System has just issued a well illustrated souvenir book, showing the magnitude of its operations, and fully describing the different departments of the system. Mr. W. T. King, publicity manager of the Winnipeg Hydro-electric System, has compiled the data. A copy of this souvenir will be mailed free of charge to anyone interested by applying to the Publicity Department, Winnipeg Hydro-electric System, 55 Princess Street, Winnipeg.

Persons Carried by B. C. E. R. Co.

In a bulletin issued by the B.C.E.R. Co., it is stated that there are about 130,000 persons carried per day in Vancouver city, with 50 per cent more on holidays, or other big days.

Advertising and the Electrical Industry

The Manitoba Electrical Association Learn Publicity Methods and Values

In the words of Jack Miner "I know as little about electricity as I do of the price of pork grease in Jerusalem" said Mr. Pratt Kuhn, western manager of the A. McKim Advertising Agency, before the Manitoba Electrical Association, at it's fortnightly luncheon, held at the Fort Garry Hotel, Winnipeg, on Thursday the 19th of October, but I do know as a layman what electricity does for me and from that end of my chart today, you perhaps may secure helpful suggestions. I find that you expected me to talk on "The Advantages to the Electrical Industry of Commercial Advertising" and I am instantly struck with the similitude of advertising and electricity.

You can't see electricity as it flows through a wire you only know that if you have produced it properly and made the right connections, it will deliver power at the far end of a wire. So with advertising properly handled; it cannot be seen at work, but it delivers sales at the retail end of its journey. Speaking of power and advertising, I am again reminded of the steam engine as it pulls the train; it costs a lot of effort to get started, but very little in proportion to keep going. So is it with advertising; the culminative results constantly lower the proportionate cost of advertising.

How does electrical advertising actually effect a layman—myself? On the way here I mentally reviewed the electrical apparatus in my house and found I could definitely trace most of it to advertising. Here is my equipment, so far: electric range; cosy stove; reversing toaster; electric irons; vacuum cleaner; coffee percolator; curling tongs; one kilowatt water heater; mazda opal globes. Now it may have cost advertising a lot of effort to get me started, but I am still buying and have become an "Electric Fan," on the lookout for something new.

That reminds me of the fact that there are between 6,000 and 7,000 electric ranges in homes of this city. This means they enjoy cheap power; it also means a market readily available for every electrictal attachment, because once the first wiring is over, once they are inoculated with the electric germs of comfort and cleanliness, they are easy victims for advertised electrical goods. Your work in Winnipeg of conducting a weekly section of electrical news in the daily papers is excellent and I must congratulate the committee who handle it so well, viz: Messrs Deering, Howard and King. I have secured many hints from it for household use. It is rather a thankless task, though, that of preparing a weekly section and I urge all members to cooperate to the fullest extent with the committee.

You asked me to speak on advertising, but I find I am speaking on the results of advertising as shown in sales, because that is what counts. It would be fallacy for me to attempt to crowd into twenty minutes the experience of twenty years, nor to do else than "High Light" my subject.

Handling, as my firm does, nearly 400 accounts, we are daily and hourly in touch with the Canadian markets as reflected in buying impulses of the people. There is a reason, a time, and a way to advertise everything, but there is no easier way to lose money than by poor advertising, so it pays to study this phase of your business just as carefully as you do your buying end, because advertising is a sales force and should reduce overhead instead of adding to it. Again as a layman I point out to you, that advertising coupled with the wonderfully cheap electric current of Winnipeg, induced me just as soon as I bought my house to install an electric range. From there on I was a legitimate prey; yet I point out to you that I have no electric grate; electric dish washer; electric washing wachine and many other items, though some day, advertising will get me on these (if I don't watch out).

May I suggest that the Electrical Industry of this city concentrate on having everything electrical around this city right; see that all store signs have globes intact, that all windows are properly illuminated, that street festoons of lights are all lighted, and no blanks, and so impress yourself on the community by the result of your good works, that they in turn will have good will towards electricity, become charged with energy and so make the result of your commercial advertising measured, in terms of sales, a real success.

Mr. C. F. Gray, who has recently returned to Winnipeg from England

Calgary Members Are Up and Doing

The Calgary Association of Electrical Contractors and Dealers, is a real live organization. This association holds its meeting every second Thursday, immediately after partaking of a light dinner. The meetings are very snappy and are over by 8:30 P.M. Following are the officers: G. M. Wilkinson (Cunningham Elec. Co. Ltd.) chairman; E. Beard (Budden, Beard & Co. Ltd.) secretary; Guy Morton (Electrical Engineers Ltd.) treasurer.

Robert MacKay, superintendent of the Electric Light & Power Department of the city of Calgary, with the assistance of the local jobbers, dealers and contractors, has been campaigning successfully on the electric range for cooking and the electric water heater for domestic use. Much credit is due Mr. MacKay for his untiring efforts.

The Cunningham Electric Company, Ltd., have recently started a sales campaign on their fourth carload of washing machines.

Guy Morton, manager of Electrical Engineers Ltd., has been successful in securing the order for the installation of a power plant to light the town of Carbon, Alberta. This plant will also supply the local mines with power.

Over 22,000 People Visited Montreal's Latest Electric Home in One Month

"We Were Not Bored Nor Made to Listen"

The Electrical Co-operative Association, Province of Quebec has just closed the doors of its most successful Electrical Home, which was held in the Notre Dame de Grace District. The total attendance from September 16th. to October the 17th. was 22,738 adults, besides a very large number of children. This seems to be the largest possible number, according to a statement by Mr. Louis Kon, the association's secretary-manager, that can be properly and satisfactorily handled from both the visitors' and the industry's point of view.

In Montreal Mr. Kon states that from the very outset of the campaign there was no desire to report spectacular numbers of visitors or to have long rows of people anxiously waiting outside to be admitted to inspect the Home, their object was to give comfort to everyone visiting the Home while seeing everything the association wanter them to see and hearing everything they wished to tell them, to give everyone an opportunity to ask any questions they may wish to ask and to make them feel as if in a Home and not in a public exhibition place. This is impossible of accomplishment if the visitors have to be pushed from one room to another and to stand three or four deep while listening to a spiel prepared for the occasion.

The Montreal Association believes this to be the wisest method to adopt, as even persons who ostensibly came to see the rugs and curtains, or to find out how a certain color of wall paper blends with some other color of hangings or up holstery, on many occasions admitted to becoming interested, and very much so, in the explanations why a home should be properly wired and what the various appliances can do for a woman householder. As one visitor expressed it.

We were not bored nor made to listen but we were free to go about as we pleased." It was not a drive for boastful figures, but for maximum results.

The official opening of the Home was performed by Alderman Seybold, representing the Notre Dame de Grace district on the city council, who expressed the Mayor's regret at his inability to be present personally, Mrs Sproule, president of the Notre Dame de Grace Women's Club, Mr. K. B. Thornton, president of the Co-operative Association and Mr. M. K. Pike, chairman of the Executive Committee as well as a large number of prominent men and women of the city, assisted at the function.

Mr. Thornton, in welcoming the official representative of the city and Mrs. Sproule, outlined the aims of the Association, its composition and the reasons why "Electrical Homes" are being organized by Associations like the Electrical Co-operative. He expressed his great pleasure at the attitude of the Citizens of Montreal towards this educational campaign to demonstrate to them the ramifications of electrical energy in simplifying, shortening and making economical the many, tedious tasks of home work.

Alderman H. B. Seybold thanked the association and its secretary-manager for selecting the Notre Dame de Grace district for this educational campaign and he felt that not only the purpose but also the manner in which the undertaking is being carried out and constructed reflect a great deal of consideration for making Montreal a city of truly modern homes besides popularizing the greatest boon of mankind—electric light, heat and power.

Mrs. Sproule, on behalf of the women of Montreal assured their heartiest support in the endeavors of the association to make every newly constructed house in their district a Modern Electrical Home. She referred to the tasteful, well planned and artistic was the Home was furnished, decorated and equipped. There was no more any doubt in her mind that the association was sincere in its statement "we wish just to educate the public as to the advantages of wider use of electricity and electrical labor saving devices."

Less fatigue, less cost and less time in managing a home is what the women of the present generation must have to fulful the additional obligations they have undertaken as citizens of the state and community. It is by means of educational exhibits like the Modern Electrical Home that the women will learn where the old methods end and the new begin.

She saw just one danger in the electrical Home and that was that the women studying it may demand instead of asking from their husbands the many useful things to be seen.

Even the most uninterested persons had admitted that it was a really charmingly decorated, furnished, illuminated and electrically equipped home; there was not a note of discord in the whole arrangement, everything was in keeping with the size, value and location of the house, it was neither over nor under done.

Visitors Enjoyed Themselves

The atmosphere of the Home and attitude of the hosts showing the visitors around and the constantly heard "thank you very much, we certainly did enjoy your hospitality and the arrangement of the home. and we shall tell our friends to visit it," made, indeed, an impression of a Home and not of an exhibition.

In the adjoining house there was installed one of the latest Radio receiving sets where popular but interesting explanations of what a Radio set is, how it works, what the functions of the various parts are, how broadcasting is done and what can be expected from a radio set now and what it is hoped it will do, were given by experts; from 8 to 10 concerts were given for the ever eager to listed crown of visitors. The radio set was not installed as a novelty and curiosity or as an additional talking point about the Home; its purpose was to develop an intelligent interest in this wonderful instrument.

Now for the Main Question?

Will this Electrical Home fulfil the expectations of the association as to its actual effect on better wiring of residences?

It most decidedly has done much already. The Lancashire Land and Construction Company, whose house was used for that exhibit have already wired a number of their houses according to the plan prepared by the association's Wiring Committee, which was the plan of wiring the Electrical Home; the committee consisted of an architect, an electrical consulting engineer, a specialist on illumination, and two electrical contractors.

It was not an Exhibition Plan, but a plan of installation reasonable in expenditure and satisfactory from the point of view of illumination and provision of switches and convenience outlets, with a service calculated on the basis of maximum possibilities in a house medium in size and in price—what is known as an average house.

There was no desire to show what **could** be done, but an attempt to make builders of homes see what **should** be done in a matter of proper electrical installation.

It may be safely stated that in Montreal a standard of proper wiring installations for medium sized dwellings has been introduced to stay.

The above mentioned company have issued a very handsome illustrated album-folder describing their houses for sale, the illustrations being the photographs of this "Modern Home." They make, in that folder the following statements: "All our houses are wired according to the plan approved and adopted by the Electrical Co-operative Association, Province of Quebec, which was the plan of the Modern Electrical Home." In calling attention to the various features of their houses, they have the following special paragraph "Electrical wiring; plentiful and properly placed convenience outlets (plugs) in all the rooms assure all the convenience and more comfort electricity offers in a fully modern home as it is understood today."

This and demonstrating to 33,290 persons who visited the two Electrical Homes during this year the desirability and advantages of properly wired homes are creating demand for such houses on the part of purchasers and tennants; speculative builders, for purely competitive reasons will have tofollow suit.

The principals of the Lancashire Land and Construction Company frankly admit that although the cost of their present electrical installation has increased from $60.00 to $225.00 per house it helps them to dispose of their houses with less effort, and besides they also admit that lately the purchasers began to be considerably more particular in the matter of demanding reasonable provision of light, switch and convenience outlets in houses offered for sale.

They have started on a building programme of some 95 houses, all of which will be properly wired for electricity.

The advertising and window displays' campaign while the Home was open to the public was based on the popularization of the "Duplex Convenience Outlet." The newspaper ads illustrated the convenience outlet, likewise the cut-outs in the window displays. around which were built-in real duplex convenience outlets to which were attached many small and large appliances displayed in front of the cut-out.

Other cut-outs had enlarged plans of the house with the lay out of wiring and all the electrical symbols.

The wings of the cut-outs in both cases had a reference to the Association. the Home and an invitation to visit it.

This Home had not only helped to get the co-operation of women in the campaign for better wired homes, but also clubs like the Kiwanis realizing that it is not a selling but an educational campaign and that the co-operative association is not a commercial enterprise, have given their support to the movement. The weekly letter of October the 2nd. mailed to all the members by C. Russell the secretary of the Montreal Kiwanis Club had the following announcement: "Make a note on your calandar and be sure to visit the Electrical Home, 323 Wilson Avenue, N.D.G. Thursday Night, October the 5th, and take your wife (or prospect) with you. The very latest development in illumination and electrical appliances will be shown and you will be well repaid for the visit. Kiwanians will be on hand to greet you and show you through this Modern Home."

On that particular night Mr. C. M. Tait, chief electrical inspector Canadian Fire Underwriters Association was in charge of the Home with the following Kiwanians connected with electrical industry to assist him in taking the guests through the Home: J. A. Anderson, J. A. Anderson & Co.; H. F. Adams, Acme Vacuum Cleaner Co.; W. H. Barry, Lincoln Electric Co.; P. H. Ferguson, McDonald & Willson L. A. Johnson, Northern Electric Co.; E. W. Sayer, Sayer Electric Co.; C. Thomson, Fred Thomson & Co.

One of the most gratifying signs of the interest visitors were taking in this Home was the fact that some of the women kept coming repeatedly with a new group of their friends to show to them what is to be had to make a house a home by the aid of electricity; women who after one visit to the Home come again accompanied by their husbands, and a large number of people kept volunteering not only their praise but their testimony that they were in the previous Electrical Home held last March, from which they gained many suggestions for improved illumination, placing of additional convenience outlets and use of appliances.

A very satisfactory number of return cards, attached to the pamphlets, which were distributed to all visitors, were received by the Association with requests for pamphlets on Wiring the Home for Convenience and Comfort" also for the "Suggested Plan of Properly Wiring Medium Sized Houses"; besides, a number of persons intending to build or actually building called in person at the Association's office for such plans.

It was found from previous experience that it is very undesirable to prepare the talk which is to be given to the visitors.

To make it sure that nothing will be omitted in explaining the points the Association was anxious the public to know, some instructions and suggestions were outlined by the secretary manager, which were read by those on duty, and developed into short talks by every host or hostess according to his own wish for expressing it. which has proved to be a good method to follow.

Contractor-Dealers' Convention, Toronto, Nov. 13 & 14

British Brass Fittings, Ltd.

George Sperryn, chairman of the British Brass Fittings Ltd., which comprises the following British firms—Sperryn & Co., Birmingham; Chas. Joyner & Co., Birmingham; Player & Mitchell, Birmingham; and Ingram & Kemp, Birmingham—was a recent visitor to Winnipeg, spending about a week in that city, studying the Canadian market. Mr. Sperryn has been visiting New Zealand and Australia, and is now on his way back to England. He was amazed at the advancement of the electrical industry in this country, and considers Canada far ahead of England as far as electrical activity is concerned.

Cora-Lites Catalogue

Dealers preparing for the busy fall and winter campaign will find the new Cora-Lites catalogue a source of fruitful hints and suggestions. The Cora-Lites catalogue is intended for anyone interested in better commercial lighting. The complete history of Cora efficiency, with descriptions and illustrations of the many different designs, is among its contents. A striking feature of its mode of arrangement is that it is in loose leaf form, thus enabling dealers to remove a page showing a single unit and permitting the customer a more definite idea as to what design he desires. Dealers may secure a copy of the catalogue by addressing the Consolidated Lamp & Glass Company, Coraopolis, Pa., or R. E. Davis. 113 Wortley Road, London, Ont.

The Century Electric Company announces that Mr. E. L. Kennedy, formerly connected with their Cleveland, Ohio, office has been appointed district sales manager at their Rochester New York office, 632 Granite Building.

Aggressive Programme Outlined by Electrical Co-operative Association, Province of Quebec

M. K. Pike, General Sales Manager of Northern Electric Company, Elected President

On October 18th. the Electrical Co-operative Association Province of Quebec held the second annual meeting. Mr. K. B. Thornton, president of the association presided; the attendance was nearly a hundred. In reviewing the past years' work both the president and the secretary manager, Mr. Louis Kon, emphasized the splendid actual results accomplished from the two "Electrical Home" exhibits held during the past year which had done so much towards establishing in the city of Montreal and vicinity a standard of proper wiring installations in dwellings. The activities and accomplishments of the Association during the past year were many and varied, and it is safe to say that the movement of co-operation in the Province of Quebec has proven itself sufficiently useful to ensure its permanency. The office of the Co-operative Association has become during the past year the centre and headquarters of almost all the organized activities of the electrical industry.

Mr. Thornton emphasized the necessity of a wholehearted support both financially and actively of such an organization as the Co-operative Association; as a proof of confidence in future results from the work of the association and an expression of satisfaction with what was already accomplished, he announced that the power companies, members of the association, and the larger manufacturers and jobbers contributors have decided to increase their contributions for the ensuing year by 25%, a lead which it is expected will be followed by all other contributors.

He also emphasized the absolute necessity of it being everybody's organization and conducted for everybody's benefit; once an attempt to serve a particular group of the industry or any particular concern were to creep into the association's work it would inevitably and deservedly collapse through loss of confidence of the public and of the members. The field of usefullness of the association is very large and he did not fear that with desire to develop it and with financial and moral assistance it will meet the expectations of those who first sponsored and initiated this movement in the Province of Quebec.

Mr. Thornton expressed his regret at the necessity of his withdrawal from active participation in the work of the association due to ever increasing business and professional responsibilities as the general manager of the Montreal Public Service Corporation and chief consulting engineer of the Montreal Tramways Company; he assured his hearers, however, of his continued interest in and support of the association's work whenever an occasion may present itself. Mr. Thornton highly commended the zeal, industry and initiative of the secretary-manager who presented a very satisfactory report. The nominating committee recommended a slate of officers, executive and an advisory council which were unanimously accepted:

Officers and Executive

Honorary President: K. B. Thornton general manager Montreal Public Service Corporation. President: M. K. Pike, general sales manager Northern Electric Company, Ltd.

Vice-presidents: J. B. Woodyatt, general manager Southern Canada Power Co. Ltd.; W. O'Brien, manager New Business Department Montreal Light, Heat & Power Consolidated; J. W. Pilcher, district manager Canadian General Electric Co.; R. J Beaumont, gen. mgr., Subsidiary Distribution Cos., Shawinigan Water & Power Company, Ltd.; F. J. Parsons, managing director, McDonald & Willson, Ltd., N. Simoneau, electrical contractor, Simoneau Electric Contracting Co.

Honorary Secretary-Treasurer: L. C. Haskell, secretary-treasurer, Southern Canada Power Co.

Secretary-Manager: Louis Kon.

The unanimous election of Mr. M. K. Pike as president and chairman of the Executive Committee assures continued success of the Association and accomplishment of the following ambitious plan for the year's work. (See next page.)

Mr. Pike will have full measure of generous support of the executive and advisory council during the present year.

Mr. Pike is an ardent supporter of the co-operative movement; his understanding of co-operation is not just talking about it, but actual work for that cause, sincere belief in it and practice wherever there is an opportunity to co-operate for a common good.

Besides being elected to the presidency of the Co-operative Association, Mr. Pike is also president of the Canadian Supply Jobbers Association and a member of the executive committee of the Canadian Electrical Association.

M. K. Pike

Among the items mentioned in the report were a number of activities of the association such as the success of the Electrical Home campaigns; the preparation of house wiring plans for distribution among architects, electrical contractors and, on occasion, to the public; the preparation of a set of standard electrical symbols for the use of architects and electrical contractors. Mention was also made of the introduction and preliminary operations of the provincial Licencing and Inspection Act; to date eighty contractors and four hundred journeymen in Montreal have obtained licences. Other activities included the issuing of bulletins, providing speakers for the co-operative luncheons and a permanent exhibit of wiring devices installed in the association office at 65 McGill College Avenue, for the purpose of showing architects what the market has to offer.

Programme 1922-1923

Modern Electrical Homes of two weeks duration in Outremont and East End or Outremont and St. Lambert; also in Quebec City and Sherbrooke.

A modern Electrical Home of three months duration open to the women three times a week from 2 to 5 p.m. where actual demonstration of the use of domestic labor-saving appliances would be given by experts. This to be worked in co-operation with various women's organizations.

Electrically equipped car in conjunction with Better Farming Train.

Industrial Lighting Exhibit for about two weeks.

Organizing of High School Students' and School Teachers' visits to power plants.

Drive for better store illumination.

Co-operative advertising.

Further distribution of wiring plans and standard symbols.

Joint luncheons with architects and development of closer co-operation with them.

Co-operation with the Government in proper enforcement of the Licensing and Inspection Act throughout the Province.

Permanent electrical corner once a week in the local press.

Continuation and broadening of activities of Trade Relations Committee.

Occassional social gatherings, theatre parties, etc.

Developing the Contractor-Dealers Association (one of the most important functions of the Association).

Organizing of Appliance and Fixture Sections.

Three or four Mass Meetings on proper methods of merchandizing electrical goods, with lectures on salesmanship by outside speakers.

Drawing of departmental stores handling electrical work and goods into the work of the Association.

Issuing of a monthly bulletin.

Better window-dressing.

Education of public on the value of electricity through moving picture films.

What Is the Cost of Appliance Selling?

(Continued from page 65)

man, and not because they are making any money upon them."

"When many of the other companies in more or less of a panic reduced their prices on these appliances this company increased its price, as it had found that it was obliged to do so in order to sell a dependable product and get out whole. Many of our people, especially the salesmen, felt that the increases in price would cut down the sales very decidedly, but the reverse has been true, owing to the increased advertising and the increased salesmen's commissions which were possible. The company nets more money per appliance, and sales are practically double what they were eight or ten months ago under the former policy."

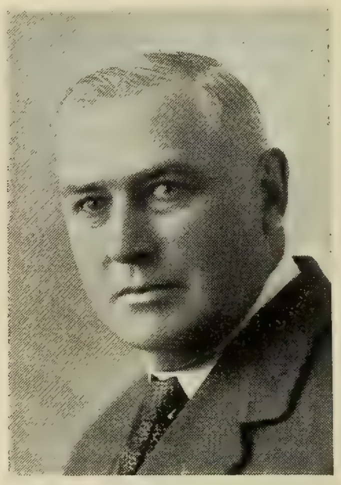
"There were so many people in our company who believed that we were selling at too low a profit, I called in the services of an unbiased expert accountant. The results of his investigations are given in the accompanying table, for June and July of this year, in percentages. While some of the costs may be open to question, and while a lot of you may think that you can do business a great deal better than the company in question, they are the actual costs. To the very great surprise of everyone, they showed that even on these higher prices the machines were being sold at a loss instead of a profit. You can well imagine that this was a very great shock. This is typical of the entire merchandising situation, and it is time for every one in the business to give careful attention to these features."

Prominent Electrical Contractor-Dealers

— I —

Harry Hicks, President Ontario Association Electrical Contractors and Dealers

The business success of Mr. Harry Hicks furnishes an excellent illustration of the fact that fair dealing and hard work are a winning combination, even if the aspirant for success has to start with very limited capital. Harry was born in 1877 at Humber Bay, Toronto, son of O. L. Hicks, prominent builder and contractor of York County. He attended the schools of Toronto, and gained his first business experience in the plumbing trade, at which he worked for 7 years. Opportunity then beckoned him and he embarked on a double venture—that of matrimony and of beginning business for himself. It was hard plugging for awhile, but he soon got things running smoothly, and his office at 137 Church Street was a busy place. After a time, he purchased the business of the late T. L. Hicks (one of the electrical pioneers of Toronto) and moved to his present stand, 203 Church Street. Here the business has grown until at the present time, Harry Hicks is one of the best known electrical and plumbing contractors in Toronto. One of the reasons for his success lies in the fact that he has always taken a keen interest in association matters, and has worked continually to improve the status of electrical contracting. A member of various organizations, he has held several offices, his latest appointment being that to the position of Chairman of the Ontario Association of Electrical Contractors and Dealers. Mr. Hicks is a firm believer in co-operation, and his consistent adherence to that principle, as regards both his business associates and employees, is one reason for the high esteem in which he is held in electrical circles.



The President, Harry Hicks

What Is the Actual Cost of Appliance Selling? Time We Quit Fooling Ourselves

Average Expense per Unit of Sales Greater Than Ordinarily Expected—The Fallacy of Price Cutting — Necessity of Independent, Prosperous Dealers — Analysis of Cost of Selling by Expert Accountants.*

The statements contained in this article are made by a man of mature experience on merchandising matters. He urges appliance men to learn their costs and to cease selling goods that do not yield them a profit. His championship of the small dealer is based on sound reasoning—a real market for appliances can only be created by the establishment of a large class of resourceful and independent dealers. His statement "too many men do not know their costs," seems to be true beyond all question.

It is a fact that people do not come in and buy electrical goods on their own initiative. More than ordinary advertising is necessary, in addition to that we must have salesmen who will go out among the people and demonstrate to them in their homes the advantages of becoming users of these appliances. This means more than the average amount of expense per unit of sales for advertising and selling which the ordinary retail merchant is expected to assume. In addition to these expenses is has been found that, like furniture, pianos and certain other household equipment, electrical merchandise must to a large extent be sold on deferred payments if a reasonable volume of business is to be expected, which introduces more cost for the carrying of accounts.

"We are altogether too prone to optimism in convincing ourselves on the most superficial information that we are making profits and that we are a little more clever than other people and can sell lower and still make money. It is time that we quit fooling ourselves.

"There seems to be a very general feeling among merchandisers—and the less experienced they are the more they are subject to such convictions—that in order to get volume of sales, prices must be made very low, and that prices can move in one direction—downward. Any effort to move them in the other direction, it is supposed, will dry up the business. This is a fallacy, particularly with articles of as much real merit and real demand as electrical appliances.

"The central stations are no doubt more responsible than the manufacturers for the fact that there is not a proper expense and profit "Spread" in the selling of appliances. When appliances first came on the market the central stations universally had very little idea of attempting to make a merchandizing profit, their whole thought being that they could afford to sell this apparatus at low prices, and even take merchandising losses,in order to rapidly place a large amount of it on their circuits, and derive the income from the sale of electricity which would result. This policy on the part of the central stations has misled the manufacturers, and the study of costs and the question of what "spreads" are essential to the retailer have been rather ignored. Appliances are sometimes put out on such a basis by central stations, that the independent dealer, even if he is fortunate enough to be able to purchase at as low a price, cannot possibly compete and live.

"The greatest importance should be placed upon the necessity of a policy which will develop prosperous dealers. The central-station companies should be leaders in this matter of selling and distributing merchandise, but even if it were good policy to attempt to monopolize the business—and it is not good policy—they cannot begin to cover the field. Their best interests lie in developing a large number of prosperous, well run, independent businesses, which will become broad distributors of the electricity-using devices that are becoming each year a more and more important factor in the income account of the central stations."

"I want to quote a letter written about a year ago by a very able and intelligent dealer in a western city, who has had a great deal of experience; 'The average dealer's discount, as you are no doubt aware, varies from 25 to 35 and 5 per cent. The average dealer's overhead is determined from stores in operation, is 28 per cent. Every family uses a cookstove, either gas or coal, and the discount to the dealer on cookstoves is from 40 to 60 per cent, varying with the make and quality of the product. Cookstoves sell themselves. Washing machines have to be sold and require not only an extensive sales force but expensive advertising as well. If the margin on washing machines was 50 per cent, every electrical dealer and contractor could be an outlet for the washing machines, but dealers today are only selling washing machines because they have listened to some persuasive argument of a good sales-

Table I—Statement of Average Unit Cost of Selling a Washing Machine for the Months of June and July, 1922

	June per cent		July per cent	
Average net selling price	100.0		100.0	
Average cost per machine sold	56.6		58.0	
Gross profit per machine		43.4		42.0
Average expense per machine sold:				
Selling:				
Commissions	17.8		18.7	
Bonus	0.8		0.8	
Premiums	1.8		2.7	
Demonstrating	1.4		1.7	
Salaries, adjustments and sundries	1.6		2.2	
Delivery and salesmen's automobiles	4.0		5.7	
Repairs	1.1		1.6	
Total selling	28.5		33.4	
Buying	2.1		2.5	
Occupancy	3.6		4.2	
Publicity	4.9		4.6	
Administrative	8.5		12.2	
Overhead expenses	19.1		23.5	
Total expenses		47.6		56.9
Average loss per machine		4.2		14.9

(Concluded on page 64)

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*Abstracted from a paper presented at the convention of the Great Lakes Geographic Division of the National Electric Light Association at French Lick Springs, Ind., by John F. Gilchrist, vice-president Commonwealth Edison Company, Chicago, Ill.

Contractor-Dealers' Convention, Toronto, Nov. 13 & 14

Border Cities Pure Food and Electric Show

The third annual Pure Food and Electric Show held under the auspices of the Border Cities Retail Merchants' Association in the Windsor Armouries from October 16th to 21st, proved to be the most successful in the history of this event.

The feature of the show was an exhibit by the local electrical-dealers in conjunction with the Windsor and Walkerville hydro-electric systems.

The number of sales of electrical merchandise made during the show was very gratifying. A great many prospects were also secured. The interest shown by the people who thronged the Armouries during the entire week augurs well for the future of the electrical industry in this locality.

At a banquet tendered the exhibitors at the Prince Edward Hotel on Friday evening, the management of the show expressed the opinion that in a short time the Electrical section would exclude the Pure Food section on account of the increase in the demand for space by the manufacturers of electrical appliances. This year approximately two thirds of the space was occupied by electrical exhibits. Thirty-five different manufacturers of electrical appliances having their merchandise on display in sixty-five booths out of a total of ninety-one. Practically every type of electric washer was shown, there being fourteen different makes. Electric ranges were next with five, while vacuum cleaners were well represented with four. The electric ironing machines attracted a great deal of attention as did the electric sewing machines. An unusual amount of interest was also displayed in the booths where fireplaces were shown; evidently the people are thinking of taking precautions in case of a coal shortage. The manufacturers and dealers expressed themselves as being well satisfied with the results obtained from the show and hope to soon fulfil the predictions of the management and make the show altogether electrical.

Signal Electric Acquires Hulbert Patents

The Signal Electric Manufacturing Company of Menominee, Michigan, has acquired the Hulbert patents and taken over the assets and liabilities of the Hulbert Electric Manufacturing Company of Chicago, Illinois. Under this arrangement production of the Hulbert battery charger will be increased and others of the Hulbert patents will be developed and put into production. Mr. C. H. Hulbert will hereafter be identified with the signal electric manufacturing company, in the capacity of research and development engineer.

F. M. Webber Joins Robbins & Myers

Mr. F. M. Webber, who for the past three years has conducted an electrical appliance business in Philadelphia, has joined the Robbins & Myers company as assistant sales manager in charge of motor sales, filling the place recently vacated by Mr. A. J. Reed, who has resigned. Mr. Webber was for sixteen years connected with the General Electric Company, entering the employ of the Ft. Wayne Works in 1903. From 1913 to 1919 he was apparatus sales manager of the St. Louis office of the General Electric Company.

A Gigantic Electric Sign

One of the largest electric signs in the country has recently been erected in Toronto by the Prest-O-Lite Company of Canada. Its appearance is most imposing and is hardly done justice to by the accompanying photograph, which of course cannot convey the striking display of color that is the distinguishing feature of the sign.

The action is as follows: First the terminals of the cables on the battery glow with a dull-red, short-circuiting the battery, then the sparks fly out like fire. After the sparks have died away the words on the sign flash into view until every one is illuminated, then all the lights go out. The border of the sign is of red and green lights which travel with a continuous movement from left to right and from right to left. The cycle of operations is carried out every twenty seconds.

The erection of the sign involved a good deal of structural work, and it had to be as carefully designed as any building or small bridge. When the plans were drawn for the sign and framework it was found that this part of the structure required 14 tons of steel. This was necessary to make up the design, carry the lighting apparatus, and to resist wind pressure and the dead and snow loads figured on. Wind pressure was a considerable item. To carry the load, a foundation embodying 32 concrete piers was used. These averaged about 1½ tons of concrete each.

The immense reproduction of a Prest-O-Lite battery was separately constructed, and weighs upwards of 1,200 pounds. This part of the sign is illuminated by flood lighting, for which 2,000 candle power is used. In the whole sign there are 1,750 electric light bulbs used, and 9,000 feet of copper wire. The machinery makes 22 contacts every 20 seconds.

The sign is 60 feet long and 30 feet high and the top is 48 feet above the ground. The letter "P" is 15 feet high, and the smallest letter 2½ feet high.

Unfortunately, the camera does not catch the brilliant display of color which floods this sign. This photograph was taken at night and gives some idea of the striking nature of the design.

The Latest Developments in Electrical Equipment

"Little Giant" Pipe Wrench

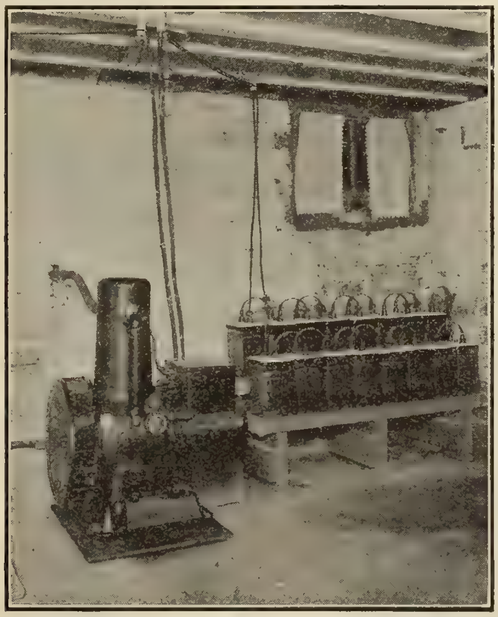
An "end-opening" pipe wrench for threading conduit has been placed on the market by the Greenfield Tap and Die Corporation, Greenfield, Mass. It is made in three parts, a handle and jaw in one piece, a movable jaw and steel nut. The manufacturer states that the wrench can withstand stresses in excess of 4,700 in lb. A double set of teeth is provided on the main jaw. The wrench is manufactured in 8, 10, 14, 18 and 24-in. sizes.

Electric Light and Power Plant for Farms

An electric light and power plant for use where central station service is not available has been developed and recently placed on the market by the Westinghouse company.

The plant, a feature of which is its simplicity of operation, no mechanical skill or knowledge being required for that purpose, has been designed practically for furnishing both light and power for all the requirements of farms, camps, boats, suburban houses, churches, and missions.

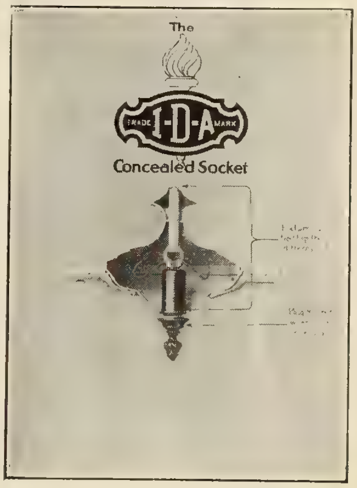
The plant, which consists of a storage battery and a generator directly connected to, and driven by, a single cylinder engine, occupies little floor space, requiring only about 2 x 1-½ feet. The engine can be run on kerosene, gasoline, or natural gas. The generator has a capacity of 750 watts and is bolted directly to the engine frame. The plant operates at a slow speed. The batteries are of molded glass and ordinarily need to be charged only every four or five days. The electric control apparatus is entirely enclosed in a box mounted on the generator frame. When the starting lever is pressed, the generator cranks the engine from the battery and, when the battery is fully charged, the engine stops itself. The length of time required to charge the battery is determined by taking a hydrometer reading directly from the liquid in the battery. This time is then set on a meter which automatically stops the engine when the correct time has been reached. A table for correcting the hydrometer reading for temperature is provided. The plant will furnish electricity for twenty two 25 watt lamps for eight hours from the battery alone or 52 lamps for eight hours from the battery and the generator combined.



A larger plant that has a capacity of twenty-nine 25-watt lamps for eight hours from the battery alone or 89 lamps for eight hours from the battery and generator combined is also being made. This larger plant also has a belt pulley for furnishing mechanical power directly from the engine and is especially adapted for use where considerable apparatus is to be used. The operation and description of this larger plant are practically the same as of the smaller one. Both are completely made, with the exception of the batteries, in the Westinghouse works.

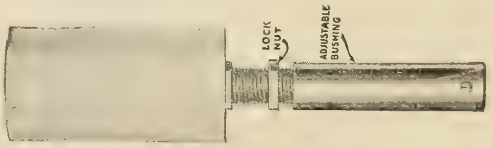
I-D-A Concealed Socket

The accompanying illustration shows the I-D-A concealed socket as manufactured by J. E. Watson Mfg. Co., 412 West Wellens Avenue, Olney, Phila., Pa. It is claimed by the manufacturers that the I-D-A Concealed Socket avoids the danger of breaking the glass shades or bulbs, besides eliminating the unsightly cord extending out of the globe. It is stated that this socket will meet the demand for an extra outlet for the table lamp, boudoir lamp, percolator, toaster, iron cleaner and various other electrical appliances. It is further claimed that it will not destroy contour of fixture, is concealed within the fixture body, no soldering, tapping or bridging, ties body shells together, quickly installed in any fixture. The removable screw plug is supplied in the following finishes: rich gilt, flemish, butler silver.



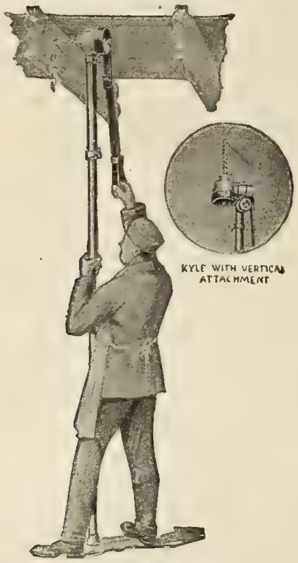
Extension Candle Socket

A new extension candle socket has been recently placed on the market by the Connecticut Electric Manufacturing Company, Bridgeport Connecticut. The device is well shown in the accompanying illustration. It is said to be especially strongly constructed so that the extension is rigid and does not require adjustment. The wires pass up through the centre of the socket so that it can be screwed into place without untwisting them. An adjustable bushing and lock nut are included in the assembly.



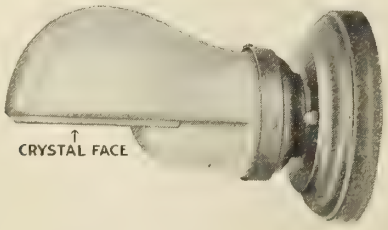
Kyle Boring Device

The Ren Automobile Supply Co., Preston, Ont., are marketing the Kyle Boring Device, a small machine that will bore holes in almost any position. It is especially recommended to wiring contractors. The head is made of 14 gage steel and has only three parts. Bushings are of phosphor bronze. The ratchets are case hardened. The bit is specially designed for this machine and has a round shank with flat notch for bit set screw. Any other electrician's bit may be used, however, by cutting off the square shank. The drive strap is, of woven fabric, 10 feet in length. A stirrup foot rest is used, fastened on the base of the smallest of the telescoping tubes. This is used to steady the machine and after the bit has started to cut, the operator can use both hands on the pull strap. A special attachment is furnished for old house-wiring, by which holes can be bored under the floor. This is a small crosspiece which is clamped around the telescoping tube at the desired depth. The device is claimed to save money on any wiring job. Distributors are wanted in different districts.



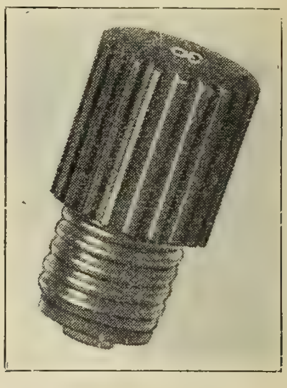
Wall Bracket of Novel Type

The Reflectolyte Company, 914 Pine St. St. Louis, Mo., are marketing a novel type of wall bracket. which they list under the heading "H R". This bracket is equipped with a half-shade, the lower horizontal surface of which is closed. The half-shade, blown in one piece of crystal glass, is opal enameled all over, except the flat horizontal lower face which remains crystal. This clear surface is provided to permit the unobstructed exit—to the lower hemisphere—of the light reflected forward and downward by the enameled walls of the shade These brackets are made with metal parts plain and ornamental and to accommodate standard S-17 lamps in 10, 15 and 25 watt capacity, and P-19 Mill type lamps in 25 and 50 watt capacity. The manufacturers state that it is a dustless, glareless side bracket which, while supplying ample, well diffused, general illumination, directs a large volume of reflected light to the working plane beneath the fixture. They are claimed to be ideal for use in hospitals, in tellers' cages and over check-desks in banks, and many locations in hotels, apartment buildings, and homes. Stock is satin brass finish. Also supplied in maltese grey applique and Maltese grey fused-on porcelain enamel finish.



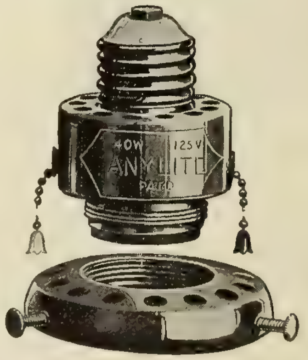
Federal Three Thirty Fuse Plug

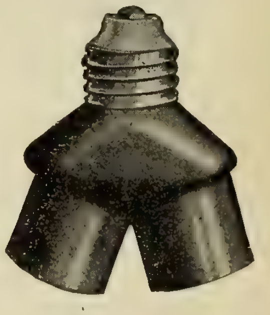
The Federal Electric Company has recently placed on the market a new renewable powder packed fuse plug, which is claims will save the blowing of plugs because of the time element feature, and also will save small motors and apparatus from being destroyed. The time element feature and powder-packed renewal element which is used in the fuse plug is said to solve the problem of taking care of the excess currents of short duration due to starting torque and small line surges; eliminating the necessity of using a plug three to four times the rating required to take care of the normal running current in order to withstand the short duration excess currents. Its construction embodies three parts. These are the outer case, the cartridge holder, and the powder-packed renewable cartridge; it can be reloaded without the use of any tools. The plug is built to with-stand short-circuits and ordinary overload blows, without injury to the holder itself. Large contact surface and substantial metal are used to give good contact. This new plug is called the Federal Three-Thirty renewable fuse plug. The same renewable element that is used in this plug is used in their regular 3-30 ampere 250 volt cartridge fuse.



Twin Socket and Regulator

In a recent issue we announced that a new side outlet plug had been placed on the market by the Anylite Electric Company of Ft. Wayne, Ind. We explained that its construction was similar to the Anylite twin plug, the cover being of cold molded insulation and the legs of hard vulcanized fibre. Two other items manufactured by the same company are illustrated herewith. Anylite products are distributed in Canada by the Dominion Carbon Brush Company, Toronto.





Current News and Notes

Calgary, Alta.

The Bloor Electric Co., electrical contractors, 1038-18th Avenue East, Calgary, Alta., were recently awarded the contract for wiring and lighting fixtures for a $10,000 bungalow, on 15th Avenue and 5th Street, Calgary for R. G. Christie.

The Brotherston Electric Co., of Calgary, Alta., have just been awarded the contract for wiring; installing fixtures; a generating plant with 110 volt, 6 kw. dynamo, and storage batteries, for the Old Suns Boarding School, Blackfoot Reservation, New Gleichen, Alta, Dept. of Indian Affairs, Ottawa; estimated contract $3,000.

W. L. Lee, electrical contractor 1030-16th Avenue West, Calgary, Alta., was recently awarded the contract for wiring, lighting fixtures, 3 fire places, hot water heater and electric range, for a $17,000 house for A. B. Himmelam. 1722-9½5 Street, West, Calgary; also contract for two houses for Hornibrook, Whitmore and Allan, 10th Street and 8th Avenue West, owners; and a third contract for three houses for W. Graves 1307-11th Street.

The Crane-Cassidy Electric Company of Calgary, Alta., were recently awarded the contract for wiring and piping for one store and twelve office suits, which is a remodelling of the old Bijou Theatre for McKenzie estate, Calgary.

Campbellford, Ont.

It is reported that the Hydro-electric Power Commission of Ontario plans to build a new power house at Lock No. 8, near Campbellford, Ont.

Cloverdale, B. C.

The ratepayers of Surrey recently passed a by-law authorizing the expenditure of $3,000 for repairs to Nicomeki River dam.

Edmonton, Alta.

The lighting system in North Edmonton will be extended soon.

Ford City, Ont.

The Hydro-electric Power Commission of Ford City, Ont., are planning extensions to the service. The main extension will be on Droiullard Road, from Seminole Street to Tecumseh Road.

Halifax, N. S.

The city council of Halifax has decided to accept a contract with the Nova Scotia Tramways & Power Co. whereby that company will look after the city's street lighting for the next fifteen years at a cost to the city of approximately $75,000. The agreement approved was drawn up by the city solicitor, the city engineer, the city electrician, and Messrs. Weston and Covert, the two last named representing the Tram Company.

Contractor-Dealers' Convention, Toronto, Nov. 13 & 14

Hamilton, Ont.

A report has been submitted by R. S. Kelsch, consulting engineer, Montreal, to the city council of Hamilton on the proposed construction by the Hydro Commission of a line of power towers across the Beach. The report is said to agree with the Commission's plans.

Kenora, Ont.

By-laws have recently been passed by the town council of Kenora, Ont., for the raising of $7,433 to extend the telephone system and $4,610 to extend the electric lighting system.

Kerrisdale, B. C.

A by-law for the installation of a municipal street lighting plant will be submitted to ratepayers by Point Grey Council.

Lake Megantic, Que.

The town council of Lake Megantic, Que., plans to construct a dam for the storage of water for power purposes. Construction will be supervised by J. O. Mignault, of Sherbrooke. An approximate cost of $100,000 is given.

Montreal, P.Q.

Mr. I. D. Livinson, who for a number of years was with the Victoria Electric Supply Company, has opened a temporary office at 121 Bleury St., Montreal. Mr. Livinson has secured the eastern representation for E. H. Freeman Electric Company, Trenton, N. J.

Mr. Irving Smith, dealer in electrical apparatus and specialities, Montreal, and known to the trade for many years, has moved from 512 New Birks building into more extensive premises at 275 Craig Street West. Mr. Smith will be remembered as the former vice-president and general manager for the R. E. T. Pringle Company Ltd., but, he has been in business for many years on his own account.

Nelson, B. C.

A by-law was recently passed by the ratepayers of Nelson, B. C., authorizing extension of the electric service lines to the north of the west arm of Kootenay Lake.

Niagara Falls, Ont.

A by-law recently passed by the city council of Niagara Falls, Ont., provides for the raising of $100,000 for the improvement of the electric light system.

Peterboro, Ont.

G. A. Bell, Deputy Minister of Railways and Canals, Ottawa, recently stated that contracts would be let at once for construction of dam at Young's Point, near Peterboro, Ont.

Port Dalhousie, Ont.

A by-law was recently passed by the municipal council providing for raising $5,000 for extending and improving the Hydro-electric system.

Quebec, Que.

At the meeting of the board of directors of the Public Service Corporation, four new directors were elected as follows: James Wilson, of Montreal; Hon. P. J. Paradis, Mr. J. H. Fortier, and Eugene Tanguay, of Quebec. The officers elected were: President, Julian C. Smith; vice-president, Howard Murray; treasurer, W. S. Hart; managing director and secretary, Eugene Tanguay. The other directors are C. H. Branchaud, Milton Hersey, John T. Ross, J. Emile Tanguay, C. E. Taschereau and George Parent, M.P. The usual quarterly dividend at the rate of 5 per cent. was declared. Receipts were announced by the president as being higher than those of the last year and business most satisfactory.

Application is being made at the forthcoming session of the Quebec Legislature to alter the present system of the Quebec Railway, Light, Heat & Power Company, by dividing the various branches of the company and having them incorporated into three district companies which will be known as:—The Quebec Power Company, the Quebec Gas Company and the Quebec Tramways Company.

St. Catharines, Ont.

The city council at a special meeting on Oct. 14, passed a resolution ratifying the by-law passed by the ratepayers in favor of the Hydro-radial line from Port Credit to St. Catharines.

Sarnia, Ont.

It is reported that extensions will be built so Hydro power will be available in Froomfield and Corunna, near Sarnia, Ont.

Stevensville, Ont.

The village of Stevensville, which is served by a rural Hydro line, was recently without electricity for two and a half days. Workmen searching to find the cause of the trouble found that a muskrat had chewed the cable and had been electrocuted.

Contractor-Dealers' Convention, Toronto, Nov. 13 & 14

Toronto, Ont.

J. S. Torry, a Toronto electrical contractor, has recently opened a store at 407 Roncesvalles Avenue, Toronto, and is dealing in electrical fixtures and appliances, as well as contracting.

Despite a surcharge of $76,929 for electric power imposed by the Provincial Hydro after the year's operation had closed, the Toronto Hydro-electric System made a net surplus of $214,353.31 during 1921, according to the report for the year. The financial position of the system as at December 31, 1921, is given as follows:

Gross income, $3,622,605.23; cost of current, operation and management, including repairs and maintenance, $2,212,373.95, leaving a gross surplus of income over operating account of $1,410,231.28. Of this amount $1,195,877.97 was absorbed by interest, depreciation, exchange, taxes, sinking funds and debenture retirals, leaving a net surplus of $214,353.31. The report further states that during 1921, 81,923 meters were in use; 221,384,558 kilowatt hours were sold; the connected load was 227,600 h.p. and the peak load 76,378 h.p. The general manager's report shows that in 1921 the number of customers increased by more than 10,400, the connected load by 32,800 h.p., and the total energy consumption by 6,400,000 k.w.h.

Twin Falls, Ont.

The Abitibi Power & Paper Co., Montreal, have placed an order with Smart-Turner Machine Co., Hamilton, for a No. 8 vertical centrifugal pump, to be driven by 25 h.p. motor, to be shipped to Twin Falls, Ont.

Walkerville, Ont.

The town council of Walkerville, Ont., plans to instal Hydro lamps on Wyandotte Street, between Kildare and Walker Roads.

Weston, Ont.

It is expected that construction of a new electric station will shortly be proceeded with at Weston, Ont. This will involve an outlay, stated to be about $10,000.

Windsor, Ont.

Mr. F. D. Reaume, has moved his store premises to 927 East Wyandotte St., Windsor. The new store will contain a much larger stock than the old one. Mr. Reaume states that the change has been made necessary by the increased volume of his business.

Winnipeg, Man.

The Great West Electric Co. Ltd., Winnipeg, have just made arrangements to handle the "Rainaud" portable lamps in Western Canada, which line embraces a large range of portable lamps of every description.

Come to the Convention, Nov. 13 and 14.

The following contracts have been recently let by the City Council of Winnipeg: Canadian Westinghouse Co., Winnipeg, constant current transformers and fixtures, $5,645, and series automatic cutouts, $1,217; Northern Electric Co., Winnipeg, glassware, $3,363; Canadian General Electric Co., electrodes, $7,235.

York Twp., Ont.

York Township Council will obtain an estimate of cost from the Hydro-Electric Power Commission for a better lighting system for Fairbank district.

Yarmouth, N. S.

Mr. K. H. Smith, chief engineer of the Nova Scotia Water Power Commission, recently outlined a scheme of Hydro development for the east branch of the Bear River. It is estimated the cost of the scheme would be around $11,150,000, and it would eventually supply the north shore of Nova Scotia from Yarmouth to Middleton. Mr. Smith said that while the preliminary plans for the scheme were not complete, he was satisfied it was sound. Distributing stations under the plan would be at Middleton, Bridgetown, Annapolis, Bear River, Digby, Weymouth, Port Maitland, and Yarmouth.

Wiring Contracts Awarded

Aylmer, Que

Stan Lewis, 63 Metcalfe Street, Ottawa, on res., Aylmer Road.

Bowmanville, Ont.

Gus Bounsal, $5,000 res.

Ford City, Ont.

G. S. Whelpton, 856 Hall Ave., Windsor, $100,000 on school .

Fredericton, N. B.

Wm. Boom, North Devon, York Co., N. B., $3,500 each 3 res., Aberdeen St.

Halifax, N. S.

Arthur & Conn, Argyle Street, $5,000 res., Henry St.

Hamilton, Ont.

T. J. Murphy & Son, 241 Robert St., $7,500 store, Aberdeen & Dundurn.

Kingsville, Ont.

Harris & Russell, $4,000 res., Prince Albert St.

Lachine, Que.

Jas. Bellefeuille, St. Joseph St., $5,000 res., semi-det., Broadway Ave.; $5,000 semi-det., res., Broadway Ave.

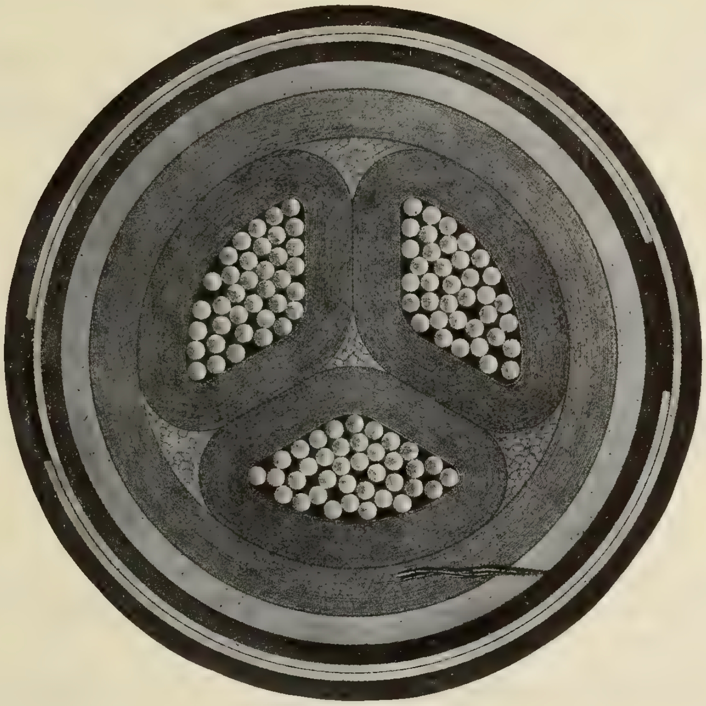
London, Ont.

Bowley Electric Co., 306 Dundas St., $30,000 add. store.

Maxville, Ont.

R. J. Desjardin, $12,000 hotel, Car & Main Streets.

POWER CABLE



350,000 C. M. 3-Conductor 12000 volt Paper Insulated, Steel Tape Armoured Cable

Overall Diameter—3.62 ins.

Built to Specification of Hydro-Electric Power Commission of Ontario

---

Eugene F. Phillips Electrical Works, Limited
Montreal

The Oldest and Largest Manufacturers of Bare and Insulated Wires and Cables in the British Overseas Dominions

Moncton, N. B.

Wm. G. Crowley, St. George St., $4,800 res., West St.; $3,500 res., High St.

Edgar Leblanc, Church St., $4,000 res., Bonnacord St.; $15,000 stores & res., John & High Sts.

Thos. Johnson, Main St., $5,000 res., Kent St.

Geo. McCall, Main St., $4,500 res., Pine Street.

G. F. Perry, Church Street, $5,570 res., Enterprise St.; $3.800 res., Enterprise St.

Montreal, Que.

J. O. Beaulieu, 2422 St. Urbain St., $24,000 res., Park Ave.

R. Chamberland, 16 Garnier Street, $10,000 flats, Breboeuf.; $8,000 res., Garnier St.

Eug. Choquette, 2090 Park Ave., $8,000 two flats, Hopper St.

A. Daoust, City Hall Ave., $7,000 res., 62 Old Orchard Ave.

Chas. Egan, 3326 Verville Street, $7,000 alt. packing house, 14 Chaboillez Sq.

A. Forget. 157 Monk Blvd., $7,000 res., Belgrave Ave.

G. Houle, 200 Boyer St., $10,000 public garage, Beaconsfield.

J. Lamarre, $14,000 two res., 394 Chambord St.

Philip Lahee & Co., 3 St. Nicholas St., $60,000 factory, Dufresne.

J. Martel, N. D. G., on 14 res., Old Orchard.

J. A. St. Amour, 2171 St. Denis Street, $156,000 school (St. Stanislas) St. Joseph Blvd.; $154,000 school & res., Demontigny St.

Sayer Electric Co., 87 Bleury St., $15,500 church, Hochelaga Dist.

D. Vanasse, 810 Papineau Ave., $8,000 3 flats, Delaroche.

Ottawa, Ont.

H. L. Allen, 272 Bank St., $7,000 res., Powell Ave.; $7.000 res., Broadway Ave.; $4,000 res., Rochester St.

P. Ackroyd, 416 Bank St., $16,000 res., Monkland Ave.

Mr. Brown, $5,000 res., Harmer Ave.

Art. Davis, LeBreton St., $8,000 2 res., Dorothy Ave.; $7,000 res., Findlay Ave.; $7,500 res. & garage, Broadway Ave.; $4,500 res., Riverdale Ave.

J. A. Ellicott, Bank St., $10,000 bible house.

E, Headly, 645 Echo Drive, $13,000 2 res., 3rd Ave.; $5.000 res., 3rd Ave.; $5,000 res., Fentiman Ave.; $5,000 res., Farraday Ave.; $5,000 res., Sunnyside Ave.

Mr. Lee, $4,000 res. & garage, Renfrew Ave.

Marchand Electric Co., Bank National Bldg., $8,500 res., Driveway.

Rideau Electric Co., Daly Ave., $3,500 res., Geneva Ave.

Stan Lewis, 63 Metcalfe St., on bakery.

Port Arthur, Ont.

A. O. Waltz, Port Arthur, $23,000 stores Arthur St.

St. Louis De Corville, Que.

A. Minard, $15,000 add. school.

Sandwich, Ont.

McNaughton McKay Electric Co., Sandwich, $205,000 school. Felix Ave.

Sault Ste. Marie, Ont.

O. C. Carney, 516 Queen E., $4,000 add. & alt. res., Summit Ave.

Rapid Electric Co., 725 Queen St., E., $7.000 business block, Wellington Street.

Smiths Falls, Ont.

Alex. Baker, $4,100 res., Becwih St.

Stratford. Ont.

Bennington Electric Co., Ontario St., $58,000 school, "Ann Hathway," Downie St.

Jas. Brandy, Cobourgh St., $3.500 res., Youngs St.

W. Gaul, Charles St., on res., Water Street; $3,000 res., Romeo St.

Toronto, Ont.

T. W. Findlay, 81 Brooklyn Ave., $7,000 res., North End Private St.

E. Forsey, 11 Pendeen Ave., Mt. Dennis, $5,000 each 1 pr. res., Earlscourt Ave.

Harris & Marson, 81 Parkway Ave., $7,500 each two stores & apts., 227-9 Roncesvalles Ave.

E. H. Hillier, 232 Bain Ave., $4,500 res., Woodycrest Ave.

J. W. Howard, 74 Russett Ave., $10,000 each 5 res., 572-580 Windermere Ave.; $10.000 res., 284 Kennedy Ave.

W. Hughes, 24 Duneaton Ave., $7,000 res., Chesterhill Rd.

Hyglo Electric Co., 2021 Yonge St., $8,000 each 3 stores & apt., Yonge Street.

Mr. Kent, $18,000 res., Graham Rd.

N. McLeod, 808 Danforth Ave., $4,500 res., Browning Ave.

Mather Electric Co., 1479 Yonge St., $3,500 each, 2 res., Montgomery Ave.

R. Mitchell, Danforth & Greenwood Aves., $6,000 1 pr. res., Strathmore Blvd.; $6.000 a pr. 2 pr. res., Strathmore Blvd.; $6,000 res., Strathmore Blvd.; $5,000 each 2 res., Coxwell Ave.

W. F. Moon & Co., 2924 Dundas W., $15,000 res., Sevington & Belsize Dr.

Nichol & Fagan, 111 Logan Ave., $8,000 1 pr. res., Soudan Ave.; $6,000 Coxwell Ave.

Wm. Priest, 668 Bloor St., West, $4,000 bungalow, 176 Earlscourt Ave.

Roxborough Ltd., 36 Front St. East, $9,000 res., Heath St. & Clifton Rd.

S. Smith, Cedarvale Ave., $6,500 res., Coxwell Ave.

E. B. Swackhammer, 33 North St., $15,000 res. (2 family) Thurloe & Belsize Dr.

Taylor Bros., 25½ Norwood Rd., $6,000 each, 4 res., Strathmore Blvd.; $6,000 each 2 res., Strathmore Blvd.; $6,000 bungalow, Strathmore Blvd.; $4,500 each 2 res., Arundel Ave.; $4,000 each 2 res., Beck Ave.; $6,500 each 2 bungalows, Strathmore Blvd.; $7,000 bungalow, Strathmore Blvd.

B. C. Taylor, 25 Marchmont Rd., $12,000 2 res., 343-5 Indian Grove; $4,500 each 5 res., Harcroft Rd.; $12,000 bungalow, Bloor St.; $8,000 res., 28 Glendale Ave.

E. H. Warman, 209 Soudan Ave., $5,000 res., Soudan Ave.

Vancouver, B. C.

T. E. Corrigan, 571 Howe St., $100,000 stores & apts. 523-29 Granville St.

Victoria, B. C.

Hawkins & Hayward, 1607 Douglas St., Vanc., $9,300 res., 1495 Rockland Ave.

Waterloo, Ont.

Otto Reiber, King Street, $5,000 res., Noecker St.

Westmount, Que.

J. A. Roy, 2561 Park Ave., on pr. res., Cote Rd.

Winnipeg, Man.

Western Elev. & Motor Co., Ltd., 183 Notre Dame East, Wpg., $45,000 building. 317 Portage Ave., (Kennedy Bldg).

Company Incorporations

Wat Electric Manufacturing Company, Limited, $500,000 Winnipeg; manufacturing, etc., of all kinds of electrical equipment.

Dominion Radio Supplies, Limited, $40,000. Guelph.; manufacturing and generally dealing in radio and other equipment.

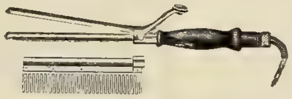
PLACE YOUR ORDER NOW FOR

XMAS GOODS

——And Assure Delivery——

Our Line is More Complete Than Ever

PERCOLATORS — HEATING PADS — CURLING IRONS
IRONS — TOASTERS GRILLS — SAMOVARS
TEA POTS WAFFLE IRONS
VIOLET RAY MACHINES — VIBRATORS — HAIR DRYERS



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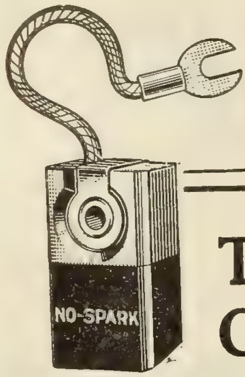
Great West Electric Co. Limited
Winnipeg

CANADIAN PORCELAIN CO.
LIMITED

HAMILTON - CANADA

Manufacturers of High and Low Tension Porcelain Insulators



An Acknowledged Leader

The No-Spark Carbon Brush

When inferior brushes are giving trouble, then the No-Spark should be substituted—just to demonstrate the difference.

Central station men swear by No-Spark Carbon Brushes.

Try Them.

CALEBAUGH
Self-Lubricating Carbon Co.
1503 Columbia Ave., PHILADELPHIA, PA.
Canadian Representatives: Electrical Equipment Company, Limited, Montreal, Canada.

Reliable Used Motors

220 Volt - 3 Phase - 25 Cycle

1— 5 H.P. General Electric 750 rpm. Complete.
1— 5 H.P. General Electric 1500 rpm. Complete.
1— 5 HP. Robbins & Myers, 1500 rpm. Complete.
1—10 H.P. Westinghouse 750 rpm. Base Pulley & Starter.
1—7½ H.P. General Electric 1450 rpm. Base, Pulley & Starter.

550 Volt - 3 Phase - 25 Cycle

1—10 HP. Can. Westinghouse, 750 rpm. Base Pulley & Starter.
2—50 HP. Crocker Wheeler, 750 rpm Base, Pulley & Starter.
1—75 HP. Crocker Wheeler, 750 rpm. Base, Pulley & Starter.

220 Volt - 3 Phase - 60 Cycle

1—30 HP. Can. Westinghouse 1200 rpm. Base, Pulley & Starter.
1—40 H.P. Can. Westinghouse 1200 rpm. Base, Pulley & Starter.
1—35 H.P. Can. Gen. Electric 900 rpm. Base, Pulley & Starter.

25 Cycle Single Phase Motors 110/220 Volt

2—1/2 HP. Century, 1500 rpm.
3—3 HP. Gen. Elec. Type RI 1500 rpm.
2— 1 HP. Century 110/220 V. 1460 rpm. 25 cycle.
2— 2 HP. Century 110/220 V. 1460 rpm. 25 cycle.
2— 3 H.P. Century 110/220 V. 1460 rpm. 25 cycle.

60 Cycle Single Phase 110/220 Volt

1—1	HP. Peerless	1800 rpm.
1—3	HP. Wagner	1800 rpm.
1—4	HP. Century	870 rpm

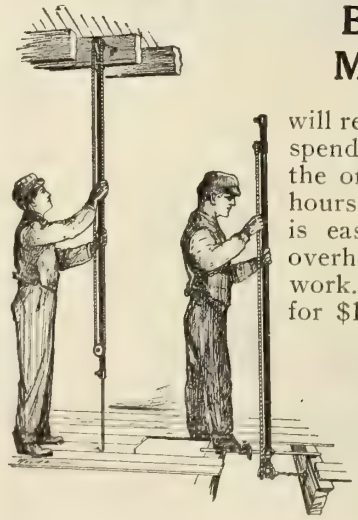
REPAIRS REWINDING REBUILDING

All types and sizes of Motors, Generators and Transformers. Our work has been proven by the largest railway, mining, pulp and paper industries in the Province and also by 21 Public Utility Commissions.

The Sterling Electrical Company
St. Catharines, Ont.
W. Mackenzie E. A. Dodington

Cut Your Costs by Saving Time

BOWLUS CHAIN DRIVE BORING MACHINE



will reduce the time you spend boring holes in the ordinary way from hours to minutes. It is easily adjusted for overhead or below floor work. Sells complete for $16.50.

Get particulars on this and our other electrical supplies and appliances at lowest wholesale prices.

Dominion Electric Supply
Company, Limited
110 Queen St. W. Toronto, Ontario

Motors in Stock

SECOND-HAND 3 PHASE, 60 CYCLE, 220 V. MOTORS

1—50 H.P. 900 RPM. Westinghouse, Complete
1—20 H.P. 1200 RPM. T.H.E., Complete
1—20 H.P. 1200 RPM. Westinghouse, Complete
1—15 H.P. 1800 RPM. C.W., Complete
1—7½ H.P. 1800 RPM. T.H.E., Complete
1—7½ H.P. 1200 RPM. A.C., Complete
1— 5 H.P. 1200 RPM. Westinghouse
1— 2 H.P. 600 RPM C.G.E.
1— 1 H.P. 1800 RPM. T.H.E.
1— 2 H.P. 1800 RPM.

SECOND-HAND 2 PHASE, 60 CYCLE, 220 V. MOTORS

1—50 H.P. 900 RPM. Westinghouse, Complete
1—24 H.P. 1200 RPM. T.H.E., Complete
1—16 H.P. 1800 RPM. T.H.E., Complete
1—7½ H.P. 1800 RPM. T.H.E., Complete
1— 3 H.P. 1800 RPM. T.H.E.
1— 1 H.P. 1800 RPM. T.H.E.
1—½ H.P. 1800 RPM. T.H.E.

SECOND-HAND 3 PHASE, 25 CYCLE, 550 V. MOTORS

1—50 H.P. 750 RPM. Westinghouse
1— 5 H.P. 1500 RPM. T.H.E.

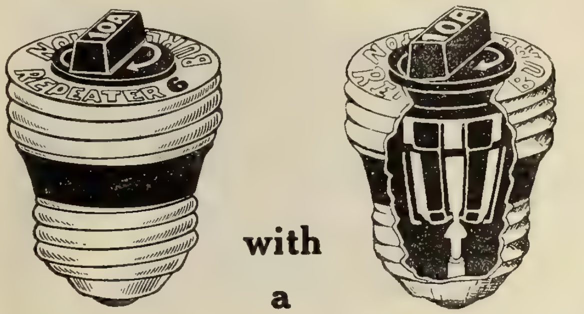
SECOND-HAND 3 PHASE, 25 CYCLE, 220 V. MOTORS

1—30 H.P. 750 RPM. Westinghouse
1—15 H.P. 750 RPM. T.H.E., Complete
1—10 H.P. 1500 RPM. T.H.E.
1— 1 H.P. 1500 RPM. Westinghouse
1— 1 H.P. 750 RPM. T.H.E.
1— 5 H.P. 1500 RPM. T.H.E.

Toronto and Hamilton Electric Co., Limited

HAMILTON ONTARIO

"Turn to the right and back comes your light"



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"Repeater-6" Fuse Plug

"Repeater-6" marks the greatest forward step in the history of fuse making. It can be used six times and then refilled at a cost of a few cents. When one fuse blows, simply turn the switch to the right and back comes the power or light.

"Repeater-6" is made in 7 amperages ranging from 6 to 30 and the voltage is 110 to 125.

You can obtain your requirements from the electrical jobber or by writing us direct.

Manufactured by

Repeater Six Fuse Plug Co.
of Canada Limited
BURLINGTON, ONTARIO, CANADA

The Simplex Ironer is compact, practical, economical and amazingly efficient. It carries the same big appeal to the modern housewife as the washing machine or sewing machine.

The new models carry many new features including open end construction.

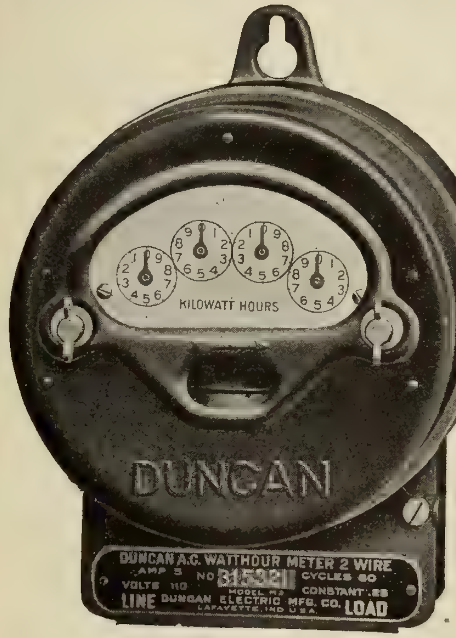
Canadian Ironing Machine Co. Limited
WOODSTOCK - ONTARIO

SIMPLEX IRONER

"THE BEST IRONER"

DUNCAN

Model M 2

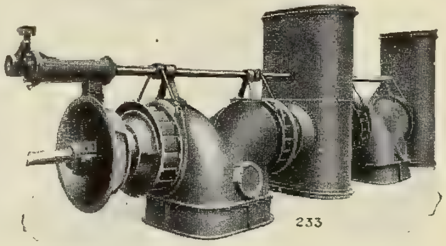

KILOWATT HOURS
DUNCAN
DUNCAN A.C. WATTHOUR METER 2 WIRE
AMP 5 NO 315321 CYCLES 60
VOLTS 110 MODEL M2 CONSTANT .23
LINE DUNCAN ELECTRIC MFG. CO. LOAD
LAFAYETTE, IND. U.S.A.

Duncan Model M-2 Watthour meters are made with an accuracy that is considered remarkable by experienced meter engineers. Their variation under the changes taking place in every-day use is unusually small, and they retain this character of performance over very long periods.

We are glad to demonstrate the superiority of Duncan Meters, or we will send you bulletins describing them fully.

THE GEORGE C. ROUGH SALES CORP'N. 134 CORISTINE BLD'G.
MONTREAL

KENNEDY
WATER POWER PLANT MACHINERY



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in Steel,
Grey Iron,
Malleable
Iron, Brass
and Bronze

Hydraulic Turbines

Special Machinery Built to Engineers' Drawings and Specifications

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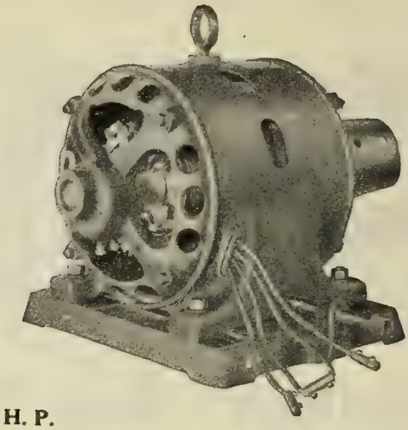

Ratings
1/8 to 40 H. P.

Repulsion Start Induction

Single Phase Motors

They Keep-a-Running

CENTURY ELECTRIC CO.

Stock carried in Cauada by:
Jones & Moore Electric Co., Ltd., 294 Adelaide St. W., Toronto
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Rudel-Belnap Machinery Co., Ltd., Canadian Express Bldg., Montreal
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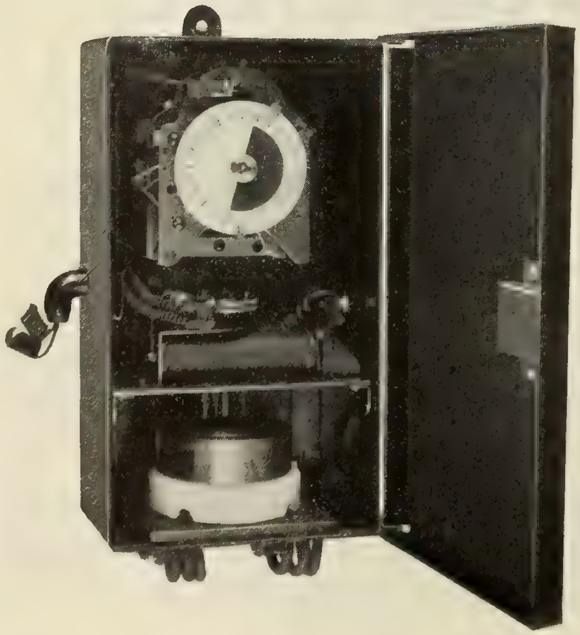
At Last, A Self-Winding Time Switch



The only self-winding time switch made.

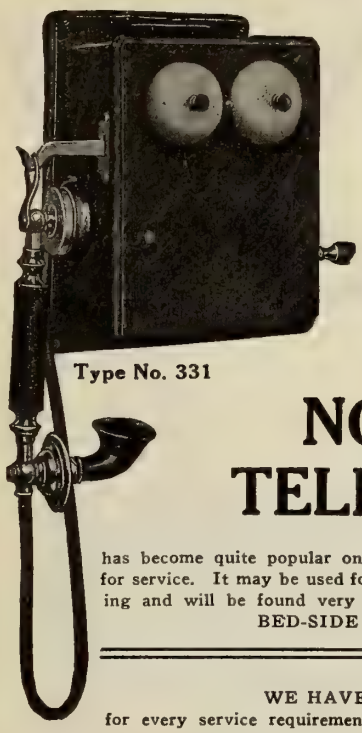
It is the only one that needs no winding—no attention whatever. And because of this, it means a big yearly SAVING TO EVERY owner.

This time switch does away with the expense of an attendant. It can be forgotten, yet it never forgets. Here is the switch people have been looking for.

Every OWNER of a time switch is a prospect; every one who needs a time switch, and hasn't one can be sold this one. There's a big field and good profit for you.

The Devoe Electric Switch Company

MONTREAL **TORONTO**



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THE

NO. 331 TELEPHONE

has become quite popular on account of the wide range for service. It may be used for either wall or desk mounting and will be found very convenient for BED-SIDE SERVICE

WE HAVE A TYPE for every service requirement.

Write for descriptive literature and prices.

Century Telephone Construction Company, Inc.

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DAVIS SLATE ELECTRICAL SLATE & MARBLE DAVIS SLATE

SLATE

Our "Fair List" No. 7

Gives Prices and Shipping Weights PER SLAB

Davis Slate & Mfg. Co. of Canada Ltd.

Exclusive Canadian and Largest American Electrical Slate and Marble Producers

610-18 East 40th Street, Chicago, Ill.
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Five Factories

DAVIS SLATE ELECTRICAL SLATE & MARBLE DAVIS SLATE

MICA

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All forms of Mica Insulation.
Cut to size—Selected to Pattern—Segments.
Mica Splittings—Washers—Ground Mica.
A complete stock of Clear Ruby Mica for Stove and other purposes.

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Hand Decorated Shades Bring Distinctive Sales

As distinctive in sales as they are in appearance there is quick profit for you in these new Consol Portables.

Inside your store, or in your show window, their striking character makes a display that wins interest.

Sure sales and distinctive trade are awaiting the new Consol Portables in your town. Your order shipped promptly.

44 exclusive designs, all new, including 18 Boudoir Lamps, enable you to offer a selection pleasing to the most fastidious. Popular prices draw trade your way.

Every shade is hand-decorated (no prints) in the popular Consolidated colors and tints. All colors are fired—they are permanent. Shades vary in size from 14 to 18 inches.

Consolidated Lamp & Glass Co.

CORAOPOLIS, PA.

R. E. DAVIS, Canadian Representative
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The Star Porcelain Company

TRENTON, N. J.

Manufacturers of Electrical Porcelain Specialties. Also specialize in the manufacture of heater bricks for electric ranges.

Canadian Line Materials

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Manufacturers of

Pole Line Hardware

Service Brackets

Rural Distribution Fixtures

Write for catalogue and prices.

SAFETY FROST
For FROSTING Incandescent Lamps, Auto Head Lights, Glass Prisms, Etc. When applied according to directions it gives a permanent Frosting to all Glass Surfaces and can be applied by any one with absolute safety
DIRECTIONS
SOLD BY
KEEP TIGHTLY COVERED

SAFETY FROST

Non-injurious to the skin, non-inflammable and absolutely permanent.

Easy to apply—Simply dip into can and allow excess to drip back for two minutes, and wash off with water.

Is not affected by weather or heat of lamp. It is on to stay.

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Makers
TROY, N.Y.

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American Electric Co. Reg.

Wholesale Jobbers

Exclusively wholesale to dealers and contractors..

Full assortment of Electrical Supplies.

Lamps of all kinds in stock. Have you seen our New Christmas Tree Outfits?

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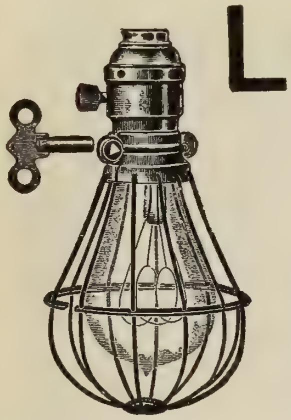

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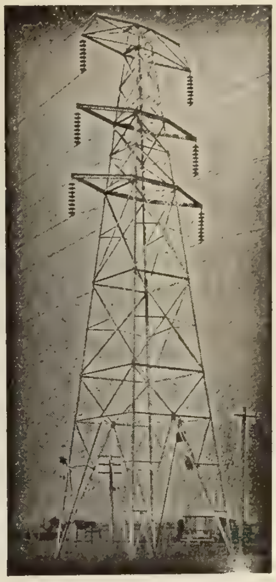

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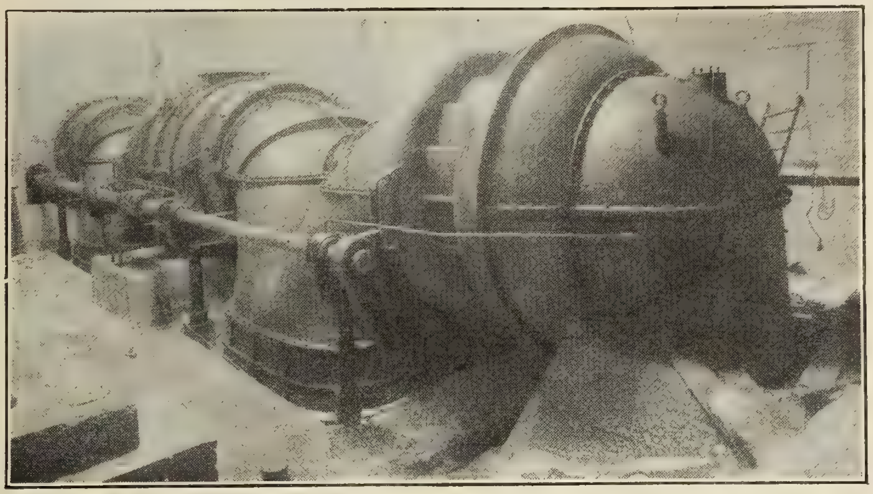

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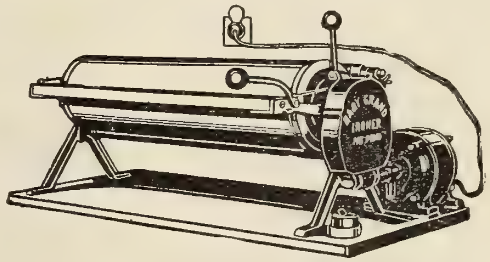

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Estimates made on power available and costs of development.
390 Phillips Place, MONTREAL
Telephone Uptown **2825.**

EARL W. MORPHY
Meter Engineer,
Meters tested, recalibrated and repaired.
Previous to Government inspection.
92 Gould St.
Toronto.
Soo, Ont.

KERRY & CHACE, Limited
ENGINEERS
President: J. G. G. Kerry
Associates; A. L. Mudge, H. R. McClymont
Hydro Electric & Steam Power Developments, Steam & Electric Railways, Pulp & Paper Mills, Industrial Engineering.
Confederation Life Bldg., TORONTO

B.L. CLARK, GEN. MGR.
H C. CHAPMAN, ASST. MGR.
E F. LONGFELLOW, SEC. TREAS.
CANADA ELECTRIC CO.
Contracting Electrical Engineers
" Work That Counts "
MAIN 1556
175 KING ST. E., TORONTO

PROMPT and EFFICIENT ELECTRICAL REPAIRS
Give your electrical equipment the attention it deserves.
Our specialties are Re-wind and Motor Repairs A. C. & D. C. also Meter Repairing,
Electric Motor Repair Co.
349 Talbot St., London, Ont.

Electrical Testing
Laboratories

"Electrical, Photometrical and Physical Tests and Inspections".

80th Street and East End Avenue,
New York, N.Y., U.S.A.

PATENTS
Trade Marks and Designs
Procured in all Countries
Special attention given to Patent Litigation
Pamphlets sent free on application
Ridout & Maybee
156 Yonge St. Toronto, Ont.

GEO. L. GUY
Electrical Engineer
Plans, Specifications and Estimates
Reports, Arbitrations and Valuations
Tribune Bldg. WINNIPEG

Save Money by Advertising for your Tenders

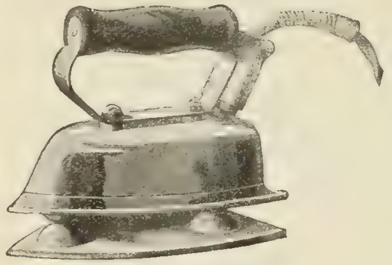
Competition will keep bids on your work or supplies down to the minimum figure. An advertisement in the

Tender Department
of the
Contract Record
and
Engineering Review

will put you in touch with the great majority of reliable contractors, and help you get the best firm for the job and the right price for the work.

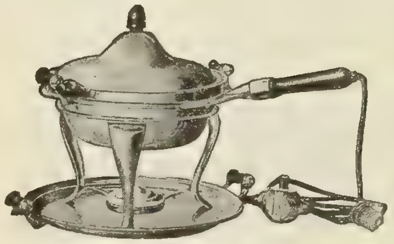
Use the Contract Record Tender Department for the next job.

Westinghouse For Christmas

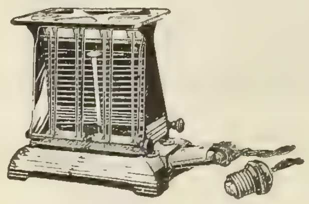


Are you prepared for the Christmas trade?

Is your stock of WESTINGHOUSE Electric Appliances complete?



This year there will be a larger demand than ever for WESTINGHOUSE products from coast to coast—and the WESTINGHOUSE trade will be a most profitable trade for you to handle.

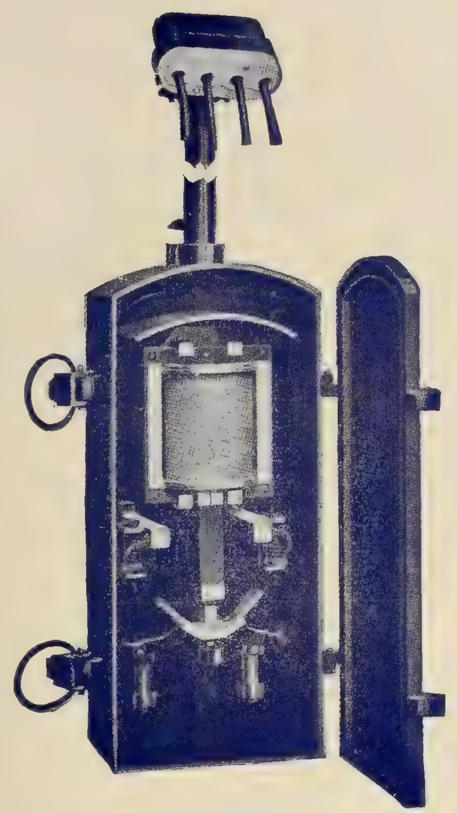


When you stock WESTINGHOUSE Appliances you are stocking the best electric appliances in the world and your customers know it!

WESTINGHOUSE sales are easy sales—the name is your best salesman.

CANADIAN WESTINGHOUSE Co.
Limited
Hamilton Canada

CANADIAN WESTINGHOUSE



Cap. 30 Amp

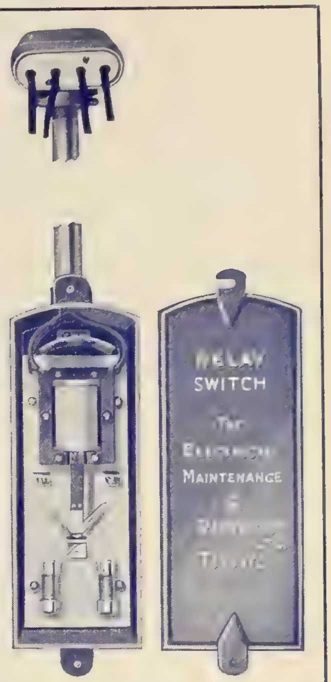
Engineers, Take Notice!

A new, smaller, simplified Remote Control Switch.

A young friend of our 30 Amp Switch—to do the many small jobs where the big fellow is too expensive.

Cheaper, yet perfectly dependable. Has been tested equal to five years' service.

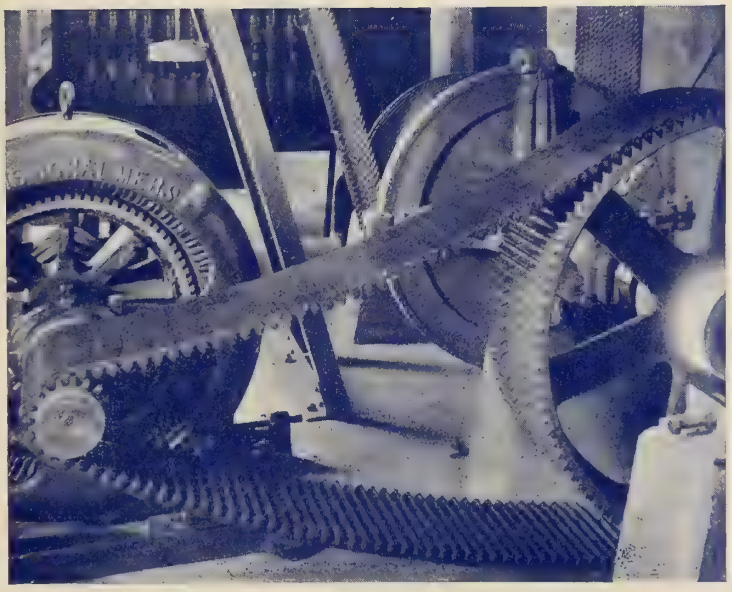
For Street Lighting Control. Write about this.



Cap. 15 Amp

The Electrical Maintenance & Repairs
Company, Limited
162 Adelaide Street West **Toronto**

Morse Silent Chains



100 H.P. Morse Chain Drives to Terminal Grain Elevator.
This is one of 39 Drives in the Elevator

YOU CANNOT BUY a BETTER DRIVE

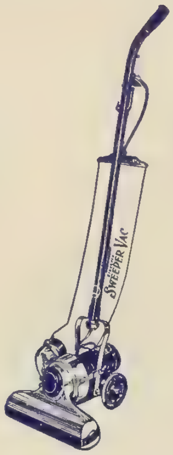
If this picture suggests a possible application of Morse Chain Drives to troublesome or expensive belt transmissions in your factory consult our sales engineers.

The Cost of Application Is Not Large

The Return on the Investment is a Large One

Canadian Agents

Jones & Glassco Reg'd
TORONTO **MONTREAL**



Electric

SWEEPER-VAC

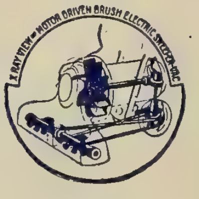
With Motor Driven Brush

It Cleans and Sweeps without injury to the rugs

FULLY GUARANTEED

Sold on easy terms **We carry the accounts**

Liberal Proposition for "Sweeper-Vac" Agencies



EARLE ELECTRIC LIMITED

Banishes Dirt ***Abolishes Dusting***

Takes the "Weeping" out of "Sweeping"

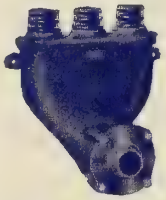
Write now for particulars and get lined up for the Spring Trade

66-72 NELSON ST.

TORONTO

Phone Adelaide 1081 **Adelaide 1082**

CABLE TERMINAL DEVICES



G and W Inside potheads are designed with the idea of making an installation both attractive and dependable.

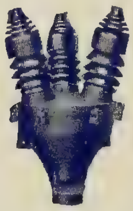
Features that insure better service include (1) Brass ring supporting and bonding cable. (2) End of lead sheath belled out at least 1½ inches in compound, providing absolute protection against moisture. (3) Soft packing compressed by screwed gland. (4) Sizes of openings standardized — all types of cable entrances. (5) No leakage of compound into conduit or coupling. (6) Slotted Brackets. (7) Substantial non-magnetic metal lids. (8) Outlet bushings cemented. (9) Proper thickness and quality of porcelain. (10) Large leakage surface for rated voltage.

The G and W Line is complete. Warehouse stocks are carried in San Francisco. Get in touch with our nearest agent, who will supply you with catalogs and other literature.

G&W Electric Specialty Co.

7440-52 So. Chicago Ave. CHICAGO, U.S.A.

POTHEADS, DISTRIBUTION BOXES



G and W Outdoor potheads incorporate in their design all of the advantages of the indoor potheads with the necessary modifications in design to make them suitable for outdoor uses.

The G and W disconnecting idea converts a cable seal into a useful piece of apparatus—it is simple and easily operated. All live metal parts are enclosed in porcelain that is safe to handle.

The possibilities for rapid disconnection for testing, emergency switching, etc., make these potheads worth far more than the slight difference in cost.

Let our nearest agent give you the details.

A. H. Winter-Joyner, Ltd., 62 Front St. W., Toronto.
A. H. Winter-Joyner, Ltd., 10 Cathcart Street, Montreal.
Bentz-Richardson Co. Ltd., 592 Notre Dame Ave., Winnipeg.
General Supplies, Limited, Calgary and Edmonton.

G & W ELECTRIC SPECIALTY CO.

Vol. XXXI No. 22 Toronto, November 15, 1922

Electrical News

Engineering
Contracting

Merchandising
Transportation

Adjusto-Lite
A FARBERWARE PRODUCT
Reg. Can. Pat. Off.

TRADE FARBERWARE BROOKLYN MARK

"The Lamp with the Clamp"

Made in Canada

RETAIL PRICE
$5
in brass finish

Bronze or Nickel finish
$5.25

West of the Rockies and in Maritime Provinces 25c additional.

Pat. U. S. A. Canada and Foreign Countries.

The electrical trade is finding Adjusto-Lite a pronounced success. It is a popular article at a popular price—unique, practical and indispensable in home, office, store and studio. It meets the universal need for clear, direct, glareless, economical light. Adjusto-Lite national advertising in MacLean's Magazine, the Canadian Home Journal and Toronto Saturday Night is creating thousands of sales for electrical dealers throughout the Dominion.

Adjusto-Lite—***"The Lamp with the Clamp"***—is packed in an attractive carton which gets immediate attention—and helps materially to close the sale. A well-arranged group of Adjusto-Lites and a few cartons make an effective window display.

At the $5 retail price there is a liberal profit for the dealer.

All jobbers in Canada handle Adjusto-Lite. Ask your wholesaler for prices—or write us. Shipments F.O.B. Brantford.

S. W. FARBER, INVENTOR 141-151 S. 5th St.
BROOKLYN, N.Y.

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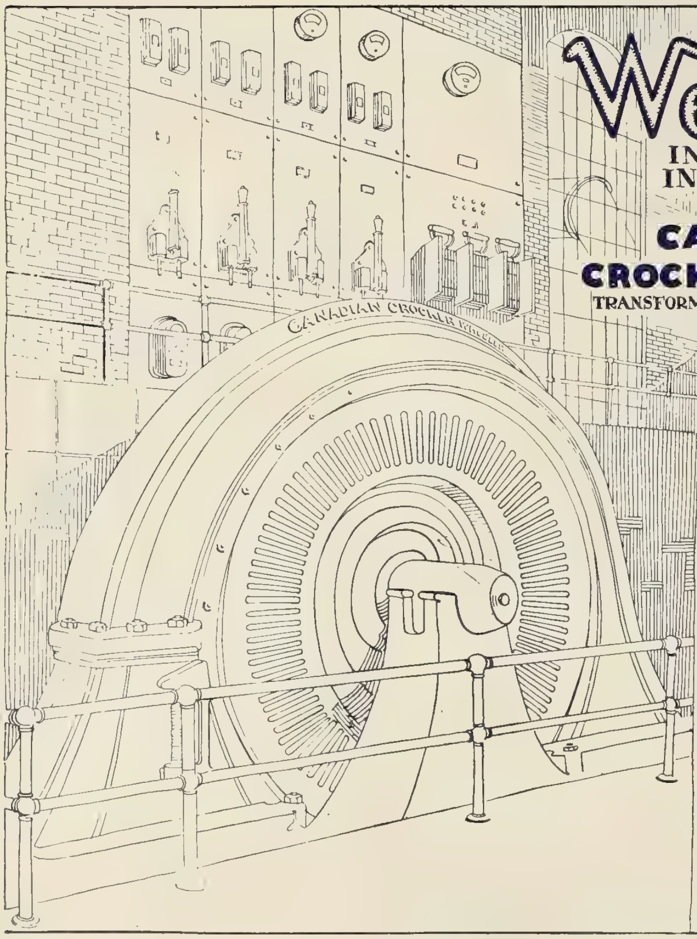
POWER APPARATUS
OF ESTABLISHED REPUTATION AND DEPENDABILITY



Weston
INDICATING INSTRUMENTS

ESTERLINE
GRAPHIC INSTRUMENTS

CANADIAN CROCKER-WHEELER
TRANSFORMERS & ELECTRICAL MACHINERY

CONDIT
OIL SWITCHES & CIRCUIT BREAKERS

SANGAMO
INTEGRATING INSTRUMENTS

C-H
CONTROL APPARATUS & HEATING EQUIPMENT

Wagner
SINGLE PHASE MOTORS

ELECTRICAL ENGINEERS EQUIPMENT CO
THREE 6
CHICAGO U.S.A.
SWITCH BOARD & PROTECTIVE FITTINGS

Northern Electric Company
LIMITED
MONTREAL TORONTO WINDSOR CALGARY
HALIFAX HAMILTON WINNIPEG EDMONTON
QUEBEC LONDON REGINA VANCOUVER
"Makers of the Nation's Telephones"

MANUFACTURING
Manual Telephones
Automatic Telephones
Wires & Cables
Fire Alarm Systems
Radio Sending and receiving Equipment

DISTRIBUTING
Construction Material
Illuminating Material
Power Apparatus
Household Appliances
Electrical Supplies
Power & Light Plants
Marine Fittings

PEANUT TUBES
Can Now be Obtained

No more need for Battery Charging. The Northern Electric R215A "Peanut" Vacuum Tube operates on Dry Battery.

The "Peanut" Tube serves as a Detector or Amplifier and is especially valuable for Radio Frequency work.

Prompt Shipment

A complete line of Radio Parts and Accessories, Receiving Sets and Broadcasting Equipment made in Canada by

Northern Electric Company
LIMITED

Montreal Quebec Toronto Windsor Regina Edmonton
Halifax Ottawa Hamilton London Winnipeg Calgary Vancouver

DEALERS APPLY TO NEAREST BRANCH HOUSE FOR PRICES AND DISCOUNTS

Exide

MADE IN CANADA

BATTERIES

Exide
BATTERIES
EXIDE BATTERIES OF CANADA LIMITED

At the Entrance to the Canadian National Exhibition

For Every Purpose

Scores of great industries rely on the willing power of Exide Batteries.

Exides propel mine locomotives and trucks; they light railway trains, operate switches, provide current for the telephone system and in many other ways play an active part in the daily life of the Dominion.

All types of Exide Batteries for all purposes are sold by Exide Batteries of Canada, Limited. You are invited to take up with us any battery problem that may arise in your business.

Exide Batteries of Canada, Limited

153 Dufferin Street, Toronto

Diamond-F

Wherever there is need of an insulating material that is tough, serviceable, of great strength, light weight and possessing high dielectric qualities—use Condensite Celoron. It is produced in sheets, rods and tubes, easily handled and ready for your own machining. Write for samples and full information.

CONDENSITE CELORON

—FOR—

SILENT WATERPROOF GEARS

Silence the clanging din of inefficient grinding gears by replacing them with Condensite-Celoron (Hard Waterproof Fibre) gears. This remarkable non-metallic, self-supporting material is water, oil and grease-proof—chemically inert, insoluble, infusible, and extremely dielectric. It requires no shrouds or end plates. Condensite Celoron will not warp, shrink or swell. It has a strength equal to cast iron and a resiliency much greater. It will take the most severe strain or sudden shock and the roughest kind of service. A card will bring complete particulars.

Diamond State Fibre Company

TORONTO
of Canada Limited
CANADA

THE L. and N. COMPANY Limited

ST. JOHNS, Que.

TORONTO
Robert G. Ross
56 Carlton St.

WINNIPEG
Fred. E. Garrett & Co.
501 Confederation Bldg.

MANUFACTURERS OF FLEXIBLE CONDUIT AND KRAFT PAPER CORD

LOOMDUCT

A Single Wall Conduit of Unusual Flexibility.

Every coil of "Loomduct" and "Insuladuct" is fished at the factory and guaranteed against defects of every kind.

INSULADUCT

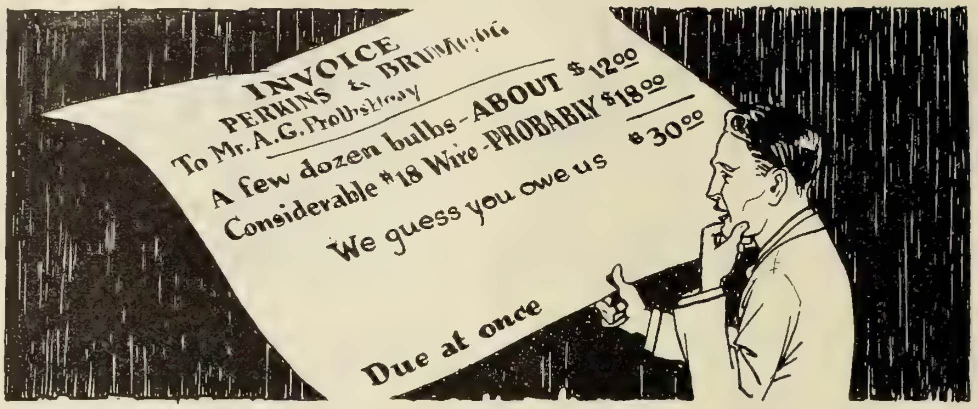
A Double Wall Conduit of Great Strength and Durability.

TRADE MARK *Loomduct* REGISTERED

APPROVED BY THE BOARD OF FIRE UNDERWRITERS : :

TRADE MARK *Insuladuct* REGISTERED

THE FOLLOWING SIZES ALWAYS IN STOCK:—¼" ⅜" ½" ⅝" ¾" 1"


INVOICE
PERKINS & BRUMM[illegible]
To Mr. A.G. Prolbsktoay
A few dozen bulbs - ABOUT $12.00
Considerable #18 Wire - PROBABLY $18.00
We guess you owe us $30.00
Due at once

Bill Your Customers as You Like to be Billed

HAVE you ever paid a bill without knowing that it was correct? Haven't you held up invoices while you investigated questionable items? Your firm's finances should be handled carefully—and so should your customer's.

A Current user, whose demand is not considered, does not pay his just proportion of your legitimate fixed charges. A user whose demand is estimated is asked to pay items figured largely from data based on "guess work." You bill your customers as you like to be billed yourself only if you measure their actual energy consumption and their K.V.A. demand. No one customer is penalized because he happens to be on the same lines with a user having a bad power factor. Each customer pays for his service in proportion to the cost of producing that service plus a legitimate margin.

The Lincoln Maximum Demand Meter measures accurately either to a watt basis or to a volt ampere basis. Its thermal principle has been accepted by leading central stations. Thousands of installations have proved it to be scientifically correct.

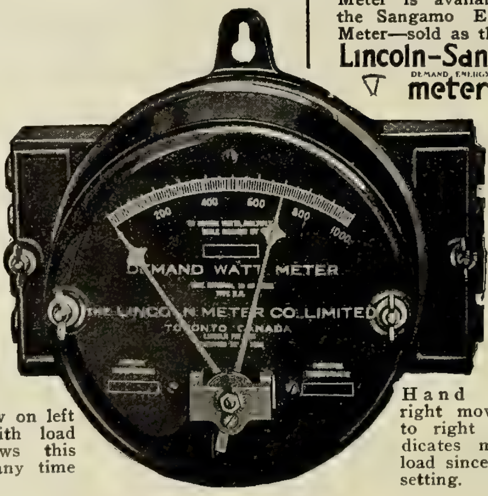
Write for information or for quotations.

Write for the section or (sections) of the Lincoln Meter catalogue which interests you. SECTION I is a non-technical treatise on why demand should be measured; SECTION II, the technical treatise on demand measurement; SECTION III, Installation; SECTION IV, the Lincoln Graphic Demand Meter; SECTION V, the Lincoln method of Volt-Ampere Demand Measurement (Power Factor recognition); and Section VI, the Lincoln Split Core Transformer and Demand Ammeter.

The Lincoln Meter Co., Limited
243 College Street, Toronto, Canada
Cable "Meters" Toronto. Phone College 1374

The Lincoln Demand Meter is available with the Sangamo Energy Meter—sold as the

Lincoln-Sangamo
DEMAND ENERGY
meter



Hand now on left varies with load and shows this load at any time of day.

Hand now on right moves only to right and indicates maximum load since last resetting.

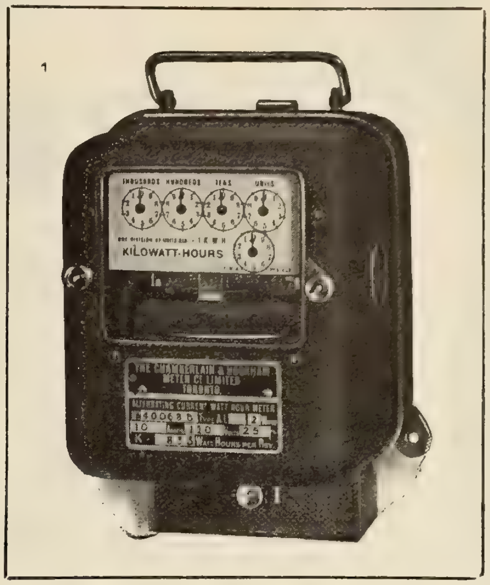
Lincoln
MAXIMUM DEMAND
meter

Government Re-Testing

302 C & H Meters were due for re-inspection in an Ontario town.

They were sent into the test room on Monday, the following Friday 302 Meters left the test room resealed, no parts or repairs being required to accomplish this end.

How's this for quality and reliability? Send us your orders.



Chamberlain & Hookham Meter Co., Limited
243 COLLEGE STREET, TORONTO
Branches all over the World

Thomson Electric Motors

in use in many of the largest manufacturing plants in Canada

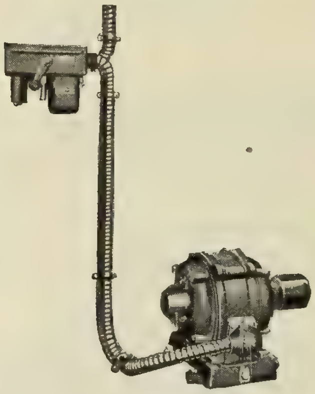
are built by

FRED THOMSON CO., LIMITED
ELECTRICAL ENGINEERS
7-13 ST. GENEVIEVE STREET MONTREAL

"TRISTEEL"

Flexible Conduit

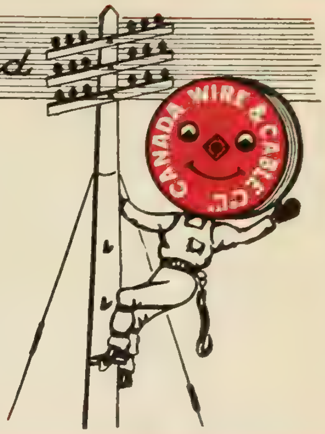
TYPICAL MOTOR INSTALLATIONS



For Economy Installations
Use
"TRISTEEL"

Sizes 5/16 to 2″ Carried in Stock

Selling Agents
Conduits Company Limited
Winnipeg - Toronto - Vancouver


CANADA WIRE & CABLE CO.

"Reel Service"

From Coast to Coast

Canada Wire & Cable Co. Limited

Halifax Montreal Toronto Regina
Winnipeg Calgary Vancouver

MANUFACTURERS OF
Copper
Bare, Weatherproof, Rubber Covered

Electrical Wires and Cables

and STEEL WIRE ROPE

CANADIAN PORCELAIN CO.
LIMITED

HAMILTON - CANADA

Manufacturers of High and Low Tension Porcelain Insulators

The Star Porcelain Company
TRENTON, N. J.

Manufacturers of Electrical Porcelain Specialties. Also specialize in the manufacture of heater bricks for electric ranges.

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Rubber Covered Wires and Cables

FOR POWER, LIGHT AND TELEPHONE WORK

Incandescent Lamp Cord, Flexible Switchboard Cables, Special Cords and Cables for all kinds of Electrical Work.

Prompt Shipments from Canadian Factory.

BOSTON INSULATED WIRE & CABLE CO., Limited

Canadian Office and Factory, HAMILTON, ONT.

GALVADUCT

LORICATED

A Galvaduct Building
New Prince Edward Hotel, Windsor, Ontario

"GALVADUCT"

The most perfect interior construction conduit on the market. Recognized as the standard of high quality.

Always specify Galvaduct or Loricated CONDUITS

"LORICATED"

A high-class interior construction conduit of the enameled type, proof against acid or other corrosive agents.

If your jobber cannot supply you—write us.

CONDUITS COMPANY LIMITED

TORONTO MONTREAL

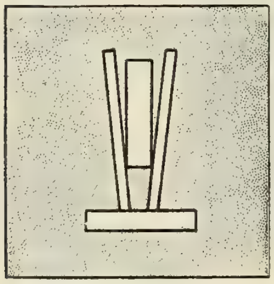
Western Sales Office: 602 Avenue Building, Winnipeg

Square D Multi-Spring Jaw

3 Points of Spring Action Insure Perfect Contact Under All Conditions

The superiority of the Square D Multi-Spring Jaw, and the reason for its use in the new 80000 Series switch, is pointed out by Prof. R. Edler in his authoritative book "Switches and Switch Gear."

He says, "The form of spring contact which was formerly much used was constructed by milling out a slot in the contact block. This method had, however, the disadvantage that the smallest inaccuracies in workmanship resulted in the production of a very poor contact. The design, consisting of two springs soldered in a block of brass or copper is not much better. An excellent contact, however, is obtained by the use of a jaw which is made of spring sheet copper, gripped and held by screws on the contact block" * * * The "excellent contact" jaw referred to is the Square D Multi-Spring Jaw, except that strip copper is used instead of sheet stock. Many electricians assert that the jaw is the most vital part of a switch. For this reason, attention is directed to the Multi-Spring Jaw, whose superior operation and longer life warrant our use of it despite its higher manufacturing costs.



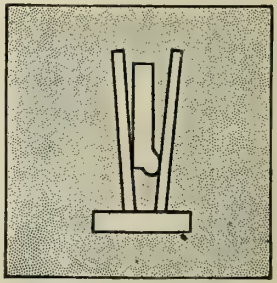
An oversize blade in a milled jaw. The slight contact producing heat at the bottom of the jaw where the spring action is destroyed and the jaw ruined

Improper Contacts Impossible

Positive contact is further insured by two other means—an insulated steel crossbar and by enclosing the quick make and quick break mechanism. Unlike fibre, the insulated steel crossbar cannot warp out of alignment, char, or split. And being within the box, the quick make and quick break mechanism cannot become clogged with dirt or grease and form only partial contact.

Exclusive Feature of Inspection

Naturally, the new 80000 Series has the common interlocking features which prevent opening of the cover when the switch is on or closing the switch when the cover is open. In addition, the Square D patented cover control, operated by a key, at last makes it possible for authorized persons to inspect an enclosed switch without interrupting the circuit and to operate the switch when the cover is open.



Showing how a blistered blade in the milled jaw gives insufficient contact. This causes overheating and ruins both blade and jaw.

Individual Bases

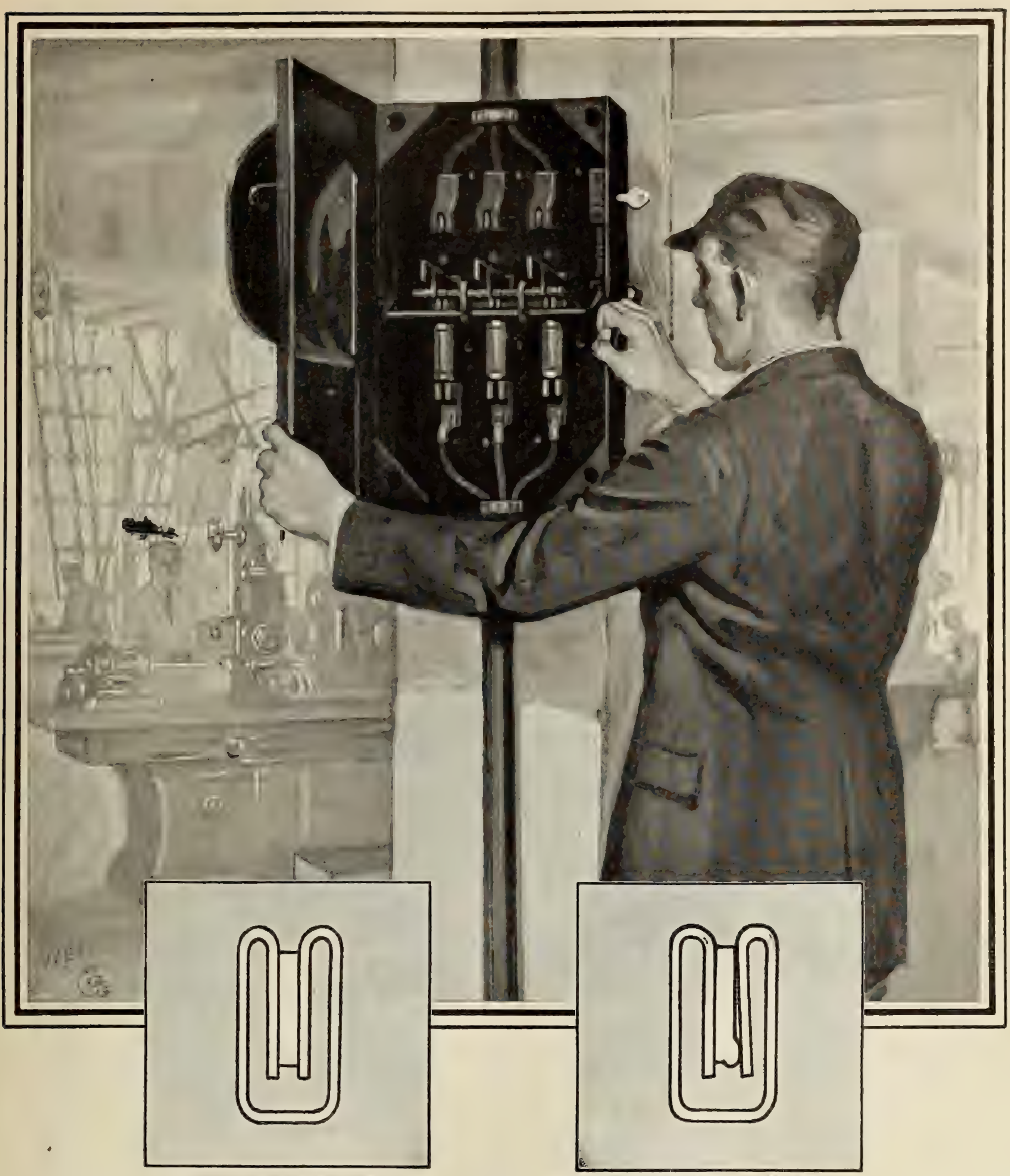
Being mounted on individual bases of moulded insulating material, any blade or jaw is removable from the front of the box in 3 minutes. This radical improvement eliminates excess weight, broken bases, and keeps maintenance costs low.

For literature and complete details of this newest Square D product embodying for the first time all the features ever demanded in a safety switch, communicate with our nearest office.

(24)

SQUARE D COMPANY, Walkerville, Ontario, Canada
Sales Offices at Toronto, Montreal, Vancouver and Winnipeg

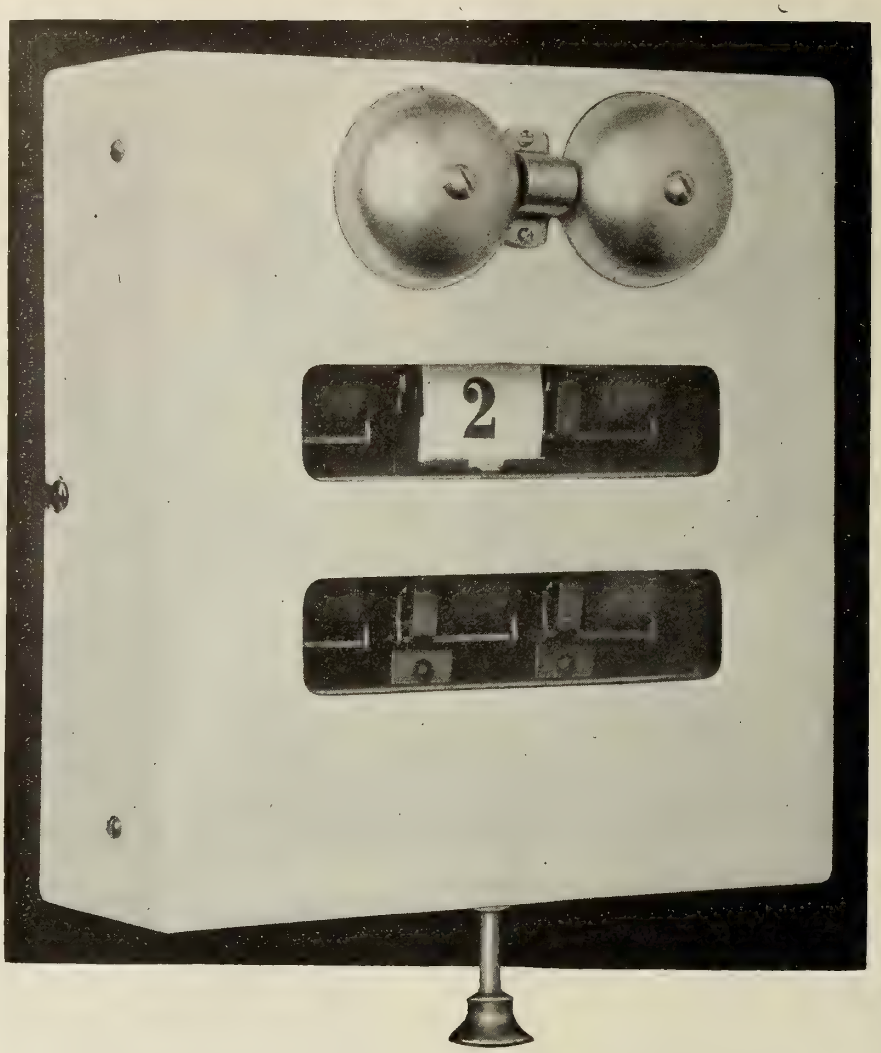
SQUARE D



A formed jaw of quarter-hard drawn spring copper. Conforms to any shape of blade

Positive contact with blistered or oversize blades. Readily realigned at any spring action

SAFETY SWITCH



Edwards No. 91 Annunciator

The "San-Fer-Ann" Annunciator illustrated above is the last word in a high class, moderate cost instrument. With its white enamelled, formed steel case and nickel-plated trimmings, it is unusually attractive and harmonizes beautifully with the kitchen trimmings in the modern home. Any discoloration may be instantly removed with a damp cloth.

The drop openings are fitted with glass and the case is secured to the backboard with substantial hinges on one side and locks on other side with screws which fit into keyed slots. This is a new and very secure form of fastening.

The bell is specially designed for annunciator service. It has double magnets, armature supported on heavy pivots, widely spaced, broad pure silver contact points with locking adjustment.

If your Jobber can't supply your needs
we can ship from Montreal stock

G. L. MacGillivray & Company Limited

3 St. Nicholas Street, Montreal

Agents for Western Canada
Cochrane-Stephenson & Co., Limited,
Winnipeg, Man.

Ontario Representative
A. R. Wooldridge,
220 King St., West, Toronto

"Northern"

The Better Heating Pad

(With Liberal Discounts for you!)

Three heats

Cutler-Hammer Switch

Size 12"x15"

Extra heavy eider-down cover

Washable Slip

Resolve to sell the best and make some real money on heating pads. You can do it with the "NORTHERN." The "NORTHERN" Heating Pad is constructed of the best of material and the quality cannot be surpassed. It is one of the best pads being manufactured today, regardless of price.

The "NORTHERN" Heating Pad is furnished complete with ten feet of cord, a three-heat switch, a two-piece attachment plug and is covered with soft eiderdown. A white washable slip is also furnished.

Specify "Northern" for the Holiday trade
—ORDER NOW—

Northern Electric Company
LIMITED

Montreal Toronto Hamilton Windsor Regina Edmonton
Halifax Quebec London Ottawa Winnipeg Calgary Vancouver

"Banfield" Wiring Devices

Have you received our Catalogue No. 6,
showing our complete line of wiring devices?

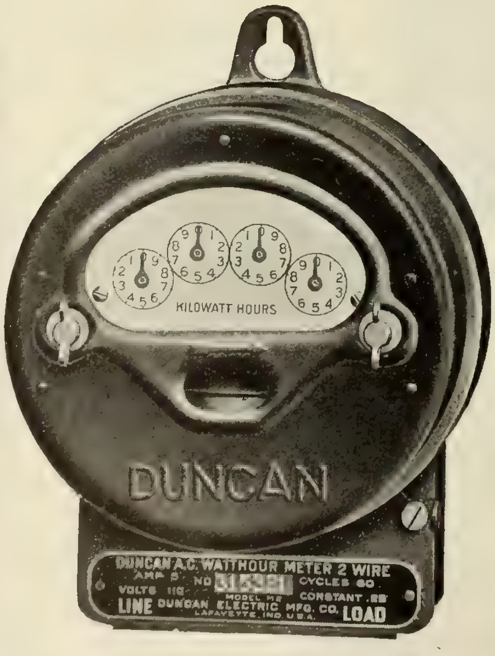
SEASONABLE DEVICES FOR FALL TRADE

Flush Push Switches **Flush Toggle Switches**
Snap Switches **Levolier Pull Sockets**

Stocked by Representative Jobbers

Cochrane, Stephenson & Co., Limited
Vancouver —Western Representatives— Winnipeg

W. H. Banfield & Sons, Limited
370 - 386 Pape Avenue - - - - - Toronto



DUNCAN

Model M 2

Duncan Model M-2 Watthour meters are made with an accuracy that is considered remarkable by experienced meter engineers. Their variation under the changes taking place in every-day use is unusually small, and they retain this character of performance over very long periods.

We are glad to demonstrate the superiority of Duncan Meters, or we will send you bulletins describing them fully.

THE GEORGE C. ROUGH SALES CORP'N. 134 CORISTINE BLD'G.
MONTREAL

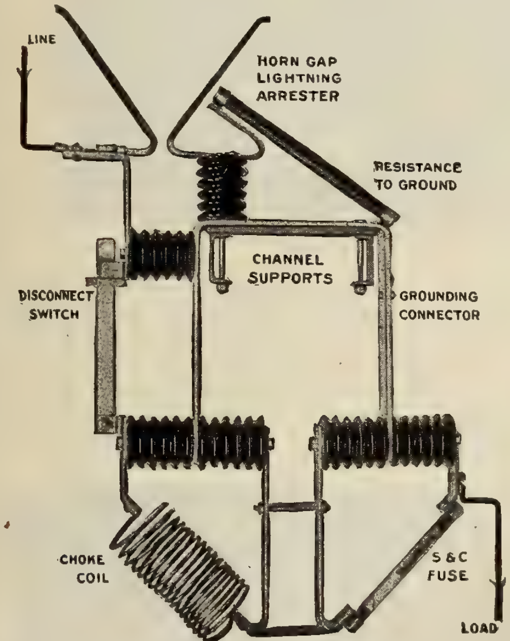
We are manufacturers, in a large way, of

TOP PINS, SIDE BRACKETS, POLE STEPS AND CROSS ARMS

We have been supplying this pole line material for years, from coast to coast, to the largest telephone, telegraph and electric lighting systems.

Our goods are specified where efficiency and economy are measured by actual results and not by purchase price only.

THE LACHUTE SHUTTLE CO., LIMITED
Lachute Mills, P. Q.



ONE SINGLE POLE "XW" UNIT
Horn Gap Arrester with Series Resistance to Ground, Disconnecting Switch, Choke Coil and "S & C FUSE" Mounting.

Simplified Substations with Complete Protection

for small and moderate loads for Rural Service, Small Towns, Industrial plants, etc.

The Economy and Simplicity of these Compact Assembled Units is at once apparent.

They are made in single pole, two pole and three pole combinations mounted on galvanized structural steel supports ready for your poles, with or without rod for operating switches from the ground.

7500-15000-25000-37000 Volt Service

Send for Bulletin 106-A

DISTRICT OFFICES:

Toronto, 24 Adelaide St. East.
Montreal, 134 Coristine Bldg.

Winnipeg, 703 Confederation Life Bldg.
Vancouver, 609 Credit Foncier Bldg.

SCHWEITZER S&C CONRAD, INC.
4435 RAVENSWOOD AVENUE CHICAGO, ILLINOIS U.S.A.

XMAS SALES

INCLUDE A LARGE NUMBER OF ELECTRIC LAMPS

We have a complete line of all sizes in stock for immediate delivery. Decorations that make the most pleasing gifts. Prices from $4.20 up, for complete lamps.

Order an assortment from us now

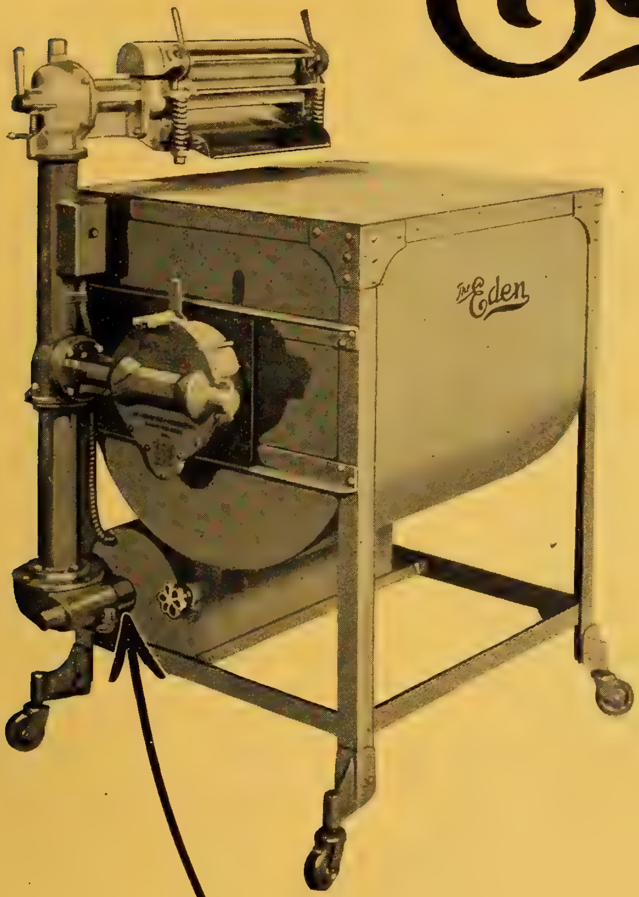
FACTORY & HEAD OFFICE
388 CARLAW AVE
TORONTO

DOWN-TOWN SHOW ROOMS
164 BAY ST. TORONTO

Jefferson Glass
MADE IN CANADA
COMPANY LIMITED

285 BEAVER HALL HILL
MONTREAL
272 MAIN STREET
WINNIPEG
510 HASTINGS ST. W.
VANCOUVER

The Eden



New Model "K" Machine Powered by C. G. E. Motors

In addition to the above this new machine embodies a number of interesting features, among which are:—

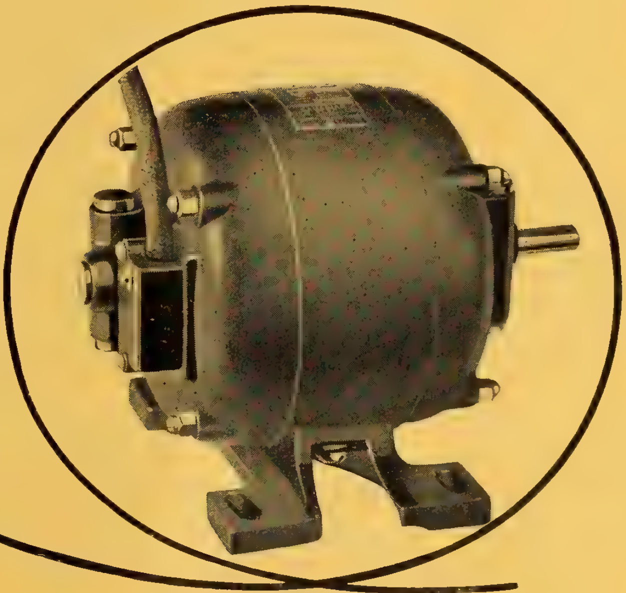
A solid Aluminum-hinged wringer of new design.

Tension Springs Wringing heavy or light articles without readjustment.

A Splash-proof switch mounted on the machine.

The Sanitary sediment zone is an exclusive EDEN feature.

These new and attractive features together with the celebrated C.G.E. motor make the Eden machine mechanically perfect.



C. G. E. Time Payment Plan

The new time payment plan is proving very popular with the electrical trade. If you have not already received particulars, our nearest branch manager will be more than pleased to supply you.

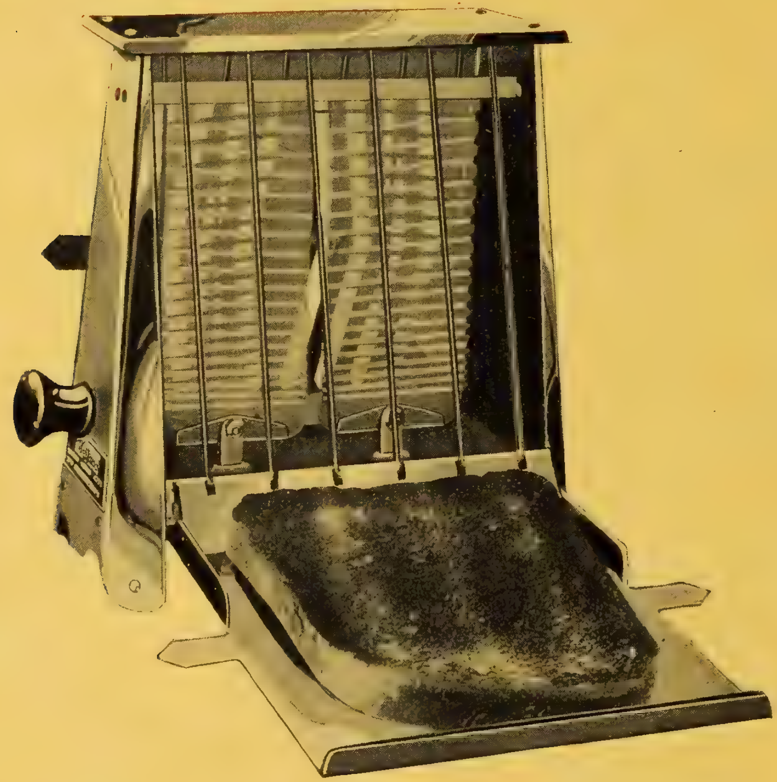
Eden Washing Machines are stocked at our different sales branches, throughout the Dominion. The sales branch you do business with will be glad to supply list prices, and explain the attractive dealer discounts.

Canadian General Electric Co., Limited

HEAD OFFICE TORONTO

Branch Offices: Halifax, Sydney, St. John, Montreal, Quebec, Cobalt, Ottawa, Hamilton, London, Windsor, South Porcupine, Winnipeg, Calgary, Edmonton, Vancouver, Nelson and Victoria.

Hotpoint



REVERSIBLE TOASTER

"Turns the Toast Without Handling"

Women demand guaranteed merchandise. The enviable reputation that all Hotpoint appliances enjoy, enables you to sell this new toaster to your most fastidious customers, and to realize that you are selling merchandise beyond reproach.

The new Hotpoint reversible Toaster retains the sterling qualities of all Hotpoint appliances, and adds the new reversible feature. The bread is turned over without handling, kept hot and toasted evenly. Supplied with a Hotpoint interchangeable cord and plug.

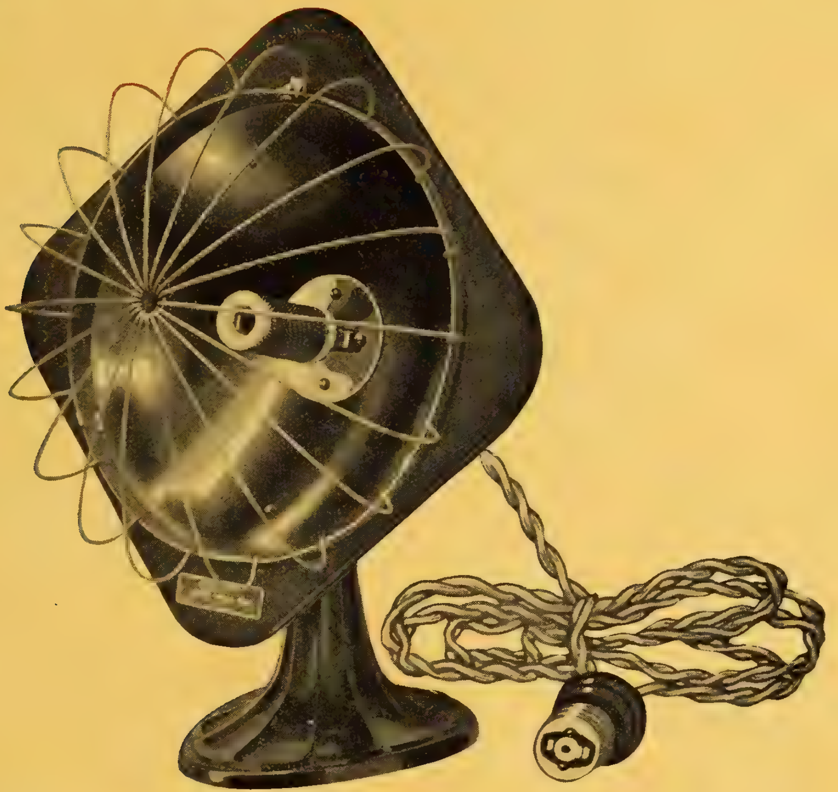
"Made in Canada"

Canadian General Electric Co., Limited

HEAD OFFICE TORONTO

Branch Offices: Halifax, Sydney, St. John, Montreal, Quebec, Cobalt, Ottawa, Hamilton, London, Windsor, South Porcupine, Winnipeg, Calgary, Edmonton, Vancouver, Nelson and Victoria.

Hotpoint



HEDLITE HEATER

"Warms as the Sun Warms"

The continued mild weather is greatly prolonging the season for portable electric air heaters. Hotpoint Hedlite Heaters are a worthy addition to the famous Hotpoint line.

This Heater is of the radiant type, portable design. The base is so weighted that if the Heater is tipped over, it will right itself immediately, thus eliminating any fire hazard. It is supplied with detachable cord and plug. Owing to the mechanical construction of the Hotpoint Hedlite Heater, the maximum amount of heat is radiated.

Your jobber or our nearest sales branch can supply you.

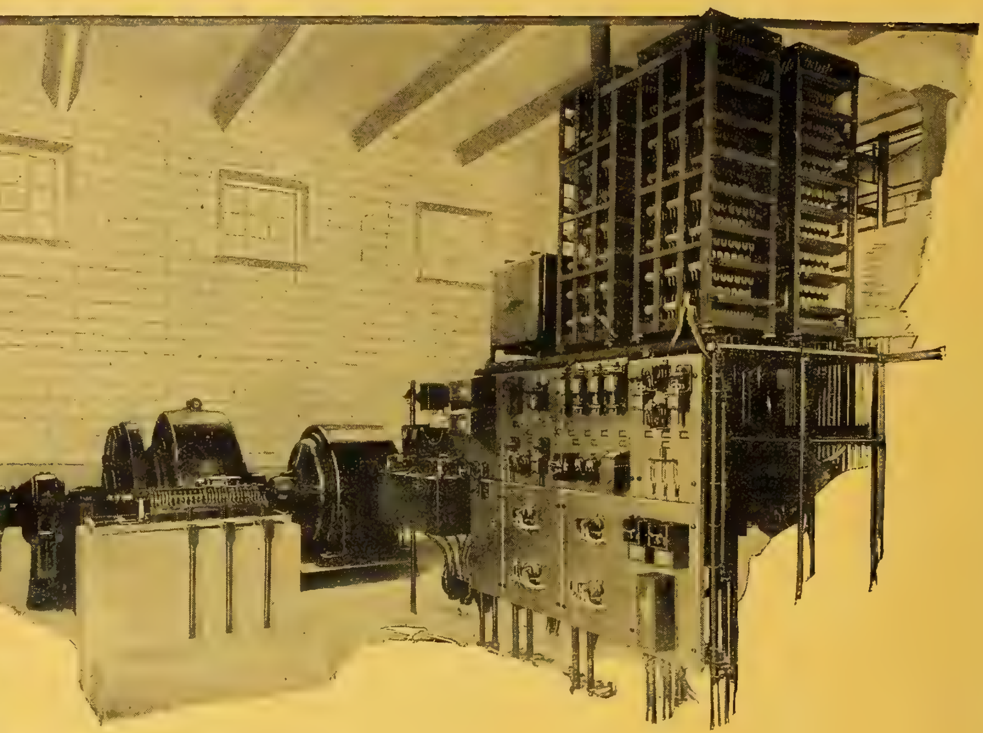
"Made in Canada"

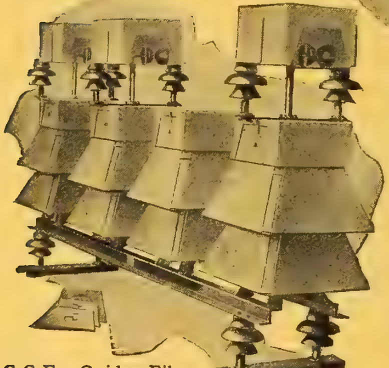
Canadian General Electric Co., Limited

HEAD OFFICE TORONTO

Branch Offices: Halifax, Sydney, St. John, Montreal, Quebec, Cobalt, Ottawa, Hamilton, London, Windsor, South Porcupine, Winnipeg, Calgary, Edmonton, Vancouver, Nelson and Victoria.

Save Money and Improve Service





C.G.E. Oxide Film Lightning Arrestor

C.G.E. Type H Transformer
"The Standard Quality"

C-G-E Automatic Substations Produce Results

Automatic Railway Substations start up and shut down as the demand for power appears or disappears. The expense for operators is eliminated so that cost for attendance is minimized.

Automatic Substations can be more closely spaced because of the lower cost of operation. This saves feeder copper and improves the trolley voltage. By shutting down under no load "running light losses" are saved for a large part of the day.

Let the automatic station engineer in the nearest C.G.E. office tell you how much your savings would be with C.G.E. automatic control.

Canadian General Electric Co., Limited

HEAD OFFICE TORONTO

Branch Offices: Halifax, Sydney, St. John, Montreal, Quebec, Cobalt, Ottawa, Hamilton, London, Windsor, South Porcupine, Winnipeg, Calgary, Edmonton, Vancouver, Nelson and Victoria.

"TROUBLE TIME" IS COMING

GET · READY · FOR "WINTER TROUBLE"

"Trouble time" is coming! Storms, sleet, ice and snow will soon be here.

Get ready now for the four hard months ahead. Look over the kits of the "trouble-shooters"—make sure your line-gangs are well supplied with Klein's "Chicago" Grips, "Haven's" Grips, "Come-Along's" and lineman's tackle.

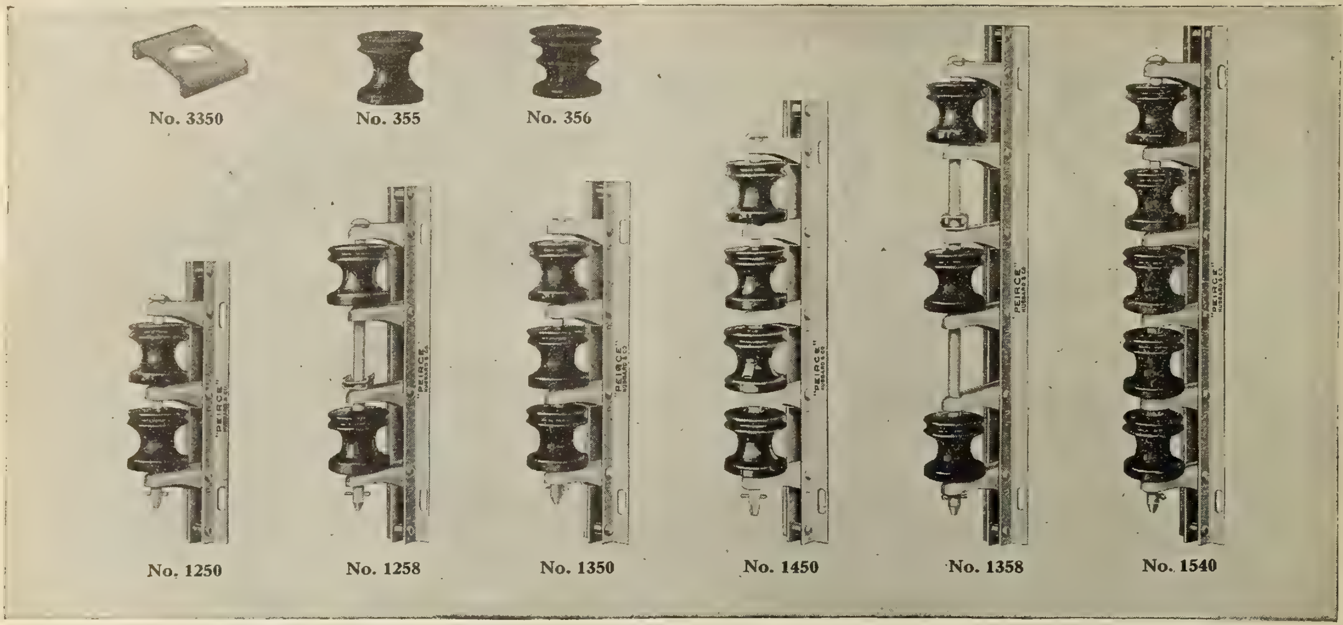
Make a list now of the extra Klein Clinkers, Safety Belts and Straps necessary for the hard winter months.

Get your order in today for the Klein tools you'll need to make your summer tool stock—"winter-size"!

Mathias KLEIN & Sons

Established 1857

Chicago Ill USA



A New Line of

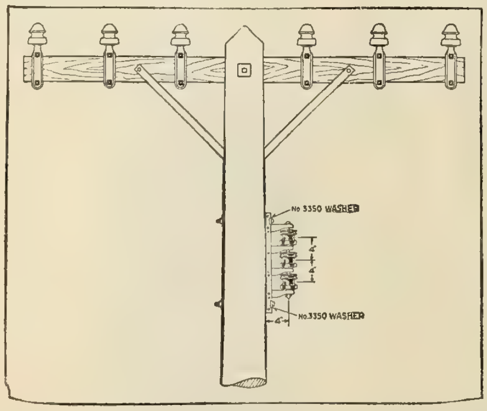
PEIRCE SECONDARY RACKS

HOT GALVANIZED

A NEW line of Peirce Secondary Racks, illustrated above, is now available. These Racks are similar in all respects to the Standard Peirce Secondary Racks, except that the angles forming the back have been extended to accommodate Through Bolts for attaching the Rack to the pole.

In designing Peirce Specialties, we have always followed as far as possible the practice of bringing the point of fastening in direct line with the strain, developing the full strength of the metal used. In following out this practice with the Standard Racks, it is sometimes necessary to remove the insulators before bolting the rack to the pole. To overcome this objection, the new line of Racks with extended backs was developed.

Standard Racks will be furnished on all orders, as in the past, unless the stock numbers shown below are specified.



Two No. 3350 Curved Washers are furnished with each Rack; these Washers are used for abridging the slot between the back Angles, to furnish a seat for the head or nut of the Through Bolt.

Stock No.	No. of Wires	Wire Spacing	Standard Bundle	Approx. Shpg. Wt. 100 Pcs.
1250	2	4	10	615
1258	2	8	10	755
1350	3	4	10	855
1358	3	8	10	1095
1450	4	4	10	1075
1540	5	4	10	1295

INSULATORS FOR PEIRCE SECONDARY RACKS

Stock No.	Type	Standard Package	Approx. Shpg. Wt. 100 Pcs.
355	Standard Single Groove	50	100
356	Special Double Groove	50	115

If the new Rack appeals to you, your Jobber will be glad to carry a stock for your convenience

"Ask Your Jobber"

N. SLATER CO., Limited

HAMILTON, CANADA

Conduit Pipe Fittings and Covers

The "J.F. Line" gives you complete service. A fitting for every requirement at a price that is right. Each fitting bears the "J.F." monogram, our guarantee of superior materials made right.

Let's Get Together at Once,
Mail the Coupon Now

Ferguson Mfg. Company Limited
174 King St. - London, Ont.
Fred E. Garrett & Company
Western Representatives 501 Confederation Life Bldg.
Winnipeg, - Man.

Ferguson Manufacturing Co. Ltd.
174 King St. LONDON, ONT.

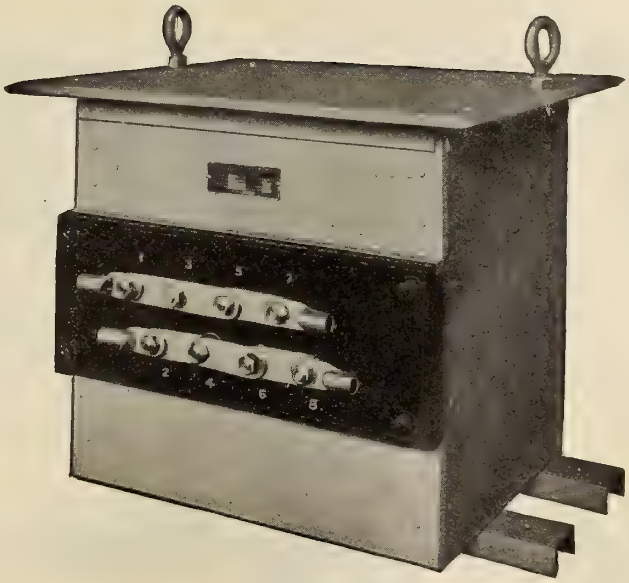
Please place our name on your mailing list to receive monthly Calendar and Price Changes. This entails no obligation on our part.

Name ....
Address ....
City or Town ....

99% of all Pipe Thawing Transformers are ordered too late

Suitable for mounting on vehicles

It's hard to think of frozen water pipes in July. They don't freeze in July—but they do in January.



Pipe Thawing Transformer

Designed especially for pipe thawing service

We are offering 20% discount on orders received before December 1st, for shipment the last of December.

FERRANTI METER & TRANSFORMER MFG. CO. LIMITED

26 Noble St. TORONTO 128 Bleury St. MONTREAL Simpson Bldg. HALIFAX 145 Market Ave. WINNIPEG
Northwestern Engineering & Supply Co. CALGARY Northern Ontario J. P. Bartleman, Timmins

If cars couldn't operate past an unbonded or poorly bonded joint, you'd be money ahead

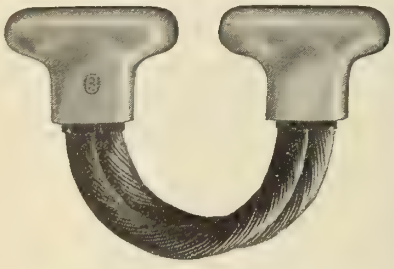
Would it seem expensive to have a car stalled and idle until the bonding crew could get to the job? That would be cheaper in the end than the way it works out now:

> Every poorly bonded joint adds its percentage to power costs.
>
> Every poorly bonded joint puts a drag on the motors—adds minutes to the car's running time.
>
> Every poorly bonded joint cuts down voltage so that the motors must pull more current than they should—which means burnt-out armatures sooner or later.
>
> Every poorly bonded joint diminishes the reading light and increases the talking grouch of the rider.

To keep costs down and service up you need good bonds.

O-B Bonds are good bonds.

You are paying more for poor bonding than good bonding costs.
O-B Bonds are good bonds.



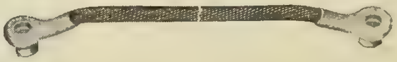
Type AW-8 Bond for Ball of Rail
Also made for Base of Rail

O-B Arc Weld Bonds have four fundamental features which simplify installation and make a better weld possible.

Type ST-2 Bond

O-B Gas Weld Bonds were pioneers. They are still first.

Type F-3 Bond
Concealed Type of Bond, installed under splice bar



Type E-2 Bond
A long bond for around the splice bar. Especially valuable on joints where rail movement is considerable

O-B Stud Terminal Bonds are made in all lengths and capacities with either compressed or pin-driven terminals.

The Ohio B Brass Co.
Mansfield, Ohio, U. S. A.

**Products: Trolley Material, Rail Bonds, Electric Railway Car Equipment, High Tension Porcelain Insulators, Third Rail Insulators*

This Window in Your Store
Will Sell
Canadian Beauty
Electrical Appliances

Because it will be backed up with three business creating advertisements in leading newspapers—Nov. 21st.,—Nov. 28th.,—and Dec. 12th. These advertisements with a Christmas appeal to make it an Electrical Christmas this year, will bring the public to you. It rests with you as to how much of their money finds its way to your cash box. You may have the use of this window

FREE FOR ONE WEEK

Ask your jobber or write direct for full information to

RENFREW ELECTRICAL PRODUCTS LIMITED

General Sales Office
29 Richmond St. W., Toronto

Factories and Head Office
Renfrew, Ont.

Makers of Majestic Sun Electric Heaters and Grates. Also Canadian Beauty Electrical Appliances—Irons, Toasters, Grills, Percolators, etc.

POLES YARDS
Quebec City
Charny
Lafontaine
Grandes Piles

OFFICE
579 St. John St.,
Quebec

Cedar Poles Northern White Cedar
Western Red Cedar

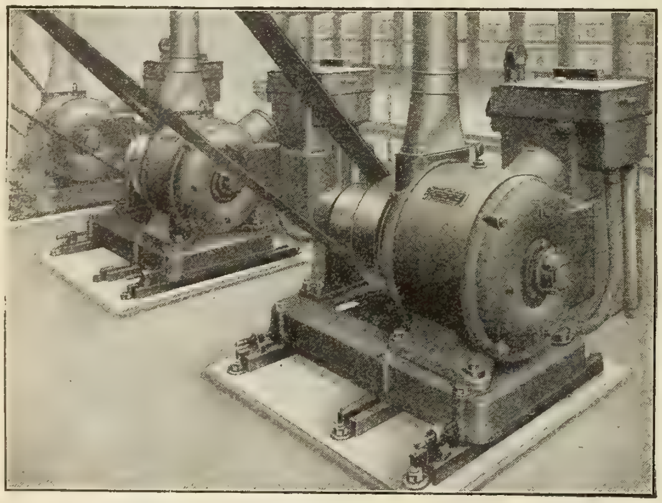
Over 25 years experience in the pole business

Let me quote you prices on your requirements

J. J. SEGUIN

Electrical Contractor and Dealer

DUST—
MOISTURE— **PROOF**
GAS—



Group of "Lancashire" Forced Draught Motors Driving Beaters in an Explosives Factory

LANCASHIRE
DYNAMO & MOTOR CO. LTD.

275 Craig St. W.
MONTREAL

45 Niagara St.
TORONTO

Prices of Shades

Like every other sensible priced commodity

Are Coming Down

Why not get our fall line?
It will make money for you.

STANDARD SILK SHADE CO
162 Parliament Street TORONTO

Interior Telephones

for

Apartment House, Factory, School, Hospital, Office

Electric Reset Annunciators and Signal Specialties

Hospital Signal System

A complete new silent call system for hospitals. Registers at nurses' quarters and office with time record, if wanted.

Canadian Factory Representatives:

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265 Portage Avenue
Winnipeg, Manitoba

COCHRANE, STEPHENSON & Co. Ltd.
608 Pacific Building
Vancouver, B. C.

TIMBERLAKE & BOURNE
New Birks Building
Montreal, Quebec

THE PIERCE ELECTRIC COMPANY
39 Richmond St., East
Toronto, Ontario

CONNECTICUT TELEPHONE & ELECTRIC COMPANY
MERIDEN, CONNECTICUT

"Turn to the right and back comes your light"

with a

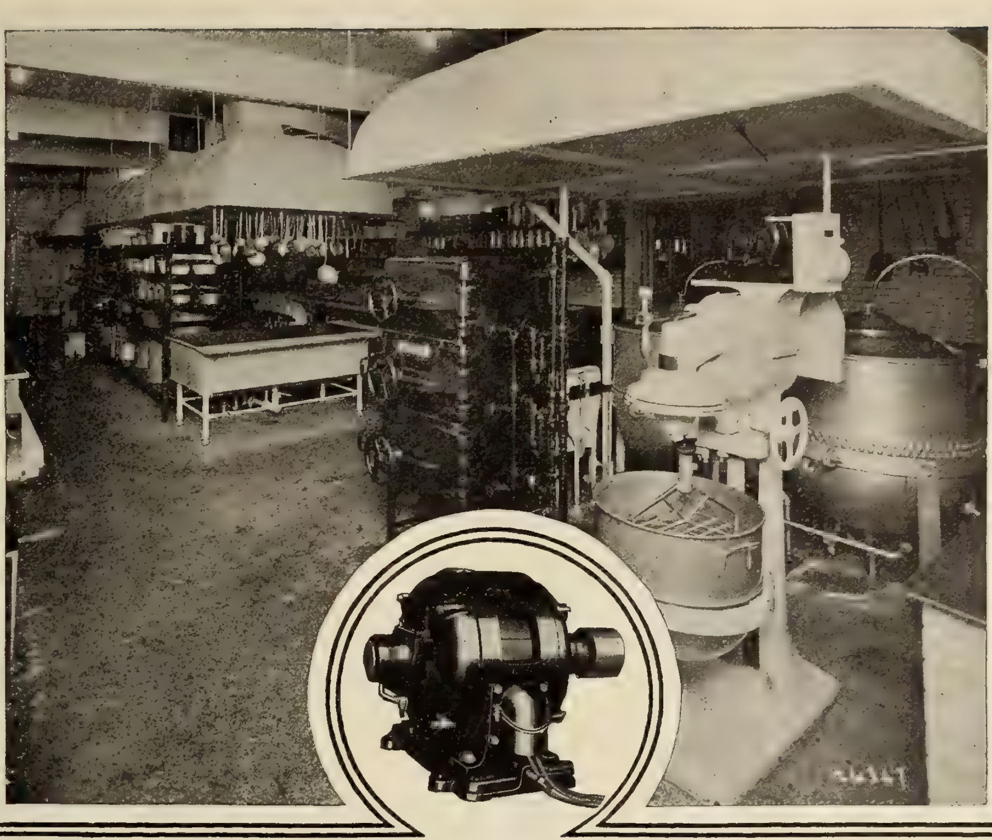
"Repeater-6" Fuse Plug

"Repeater-6" marks the greatest forward step in the history of fuse making. It can be used six times and then refilled at a cost of a few cents. When one fuse blows, simply turn the switch to the right and back comes the power or light.

"Repeater-6" is made in 7 amperages ranging from 6 to 30 and the voltage is 110 to 125.

You can obtain your requirements from the electrical jobber or by writing us direct.

Manufactured by
Repeater Six Fuse Plug Co.
of Canada Limited
BURLINGTON, ONTARIO, CANADA



MANUFACTURERS of bakers' machinery, heating systems, canning machinery, humidifying equipment and similar devices which operate in hot, moist, and frequently dust laden atmosphere, find in the R & M motor the best solution of their power problem.

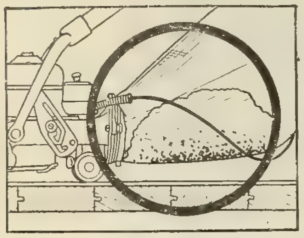
Because of their low temperature rise, thoroughly moisture-proofed windings, well protected bearings and durable finish, these motors give long, reliable service under conditions which are ordinarily considered detrimental to the best motor performance. That is the reason why so many leading manufacturers of equipment which demands the utmost in motor stamina, have made the R & M motor a standard feature of their product.

The Robbins & Myers Company of Canada, Limited

Brantford - Ontario

Robbins & Myers Motors

500% Increase in Sales This Year at Winnipeg on The HOOVER Co-operative Plan



The Hoover Bag Is Properly Reënforced

(Another Patented Hoover Feature)

THE heavy dirt which is suctioned into the bag of an electric cleaner, describes an arc and falls—as indicated above—upon a small area at the base of the bag. Naturally this portion must withstand the most wear. In the Hoover bag, a double thickness of the special chemically treated fabric is provided at this point. The remainder of the bag is but one thickness of the fabric treated so that even the finest dust particles are prevented from escaping, yet permitting the ready escape of the air, a feature necessary to real cleaning efficiency. By the special re-enforcement at the point of most wear the life of Hoover bags is materially increased. Covered by a Hoover patent granted *February 17, 1920*. Over twenty patents now protect The Hoover. Additional applications for patents are pending.

Last year the Winnipeg Hydro Electric System—one of the four Authorized Hoover Dealers in Winnipeg, Manitoba—sold 118 Hoovers valued at $8,945.

During the first six months of the current year *their sales increased to 338 Hoovers, worth $22,159!* Continuing at this rate for the last six months, their sales will show approximately a fivefold gain for 1922.

This dealer, like so many other prominent firms throughout Canada, the States, and Europe, is selling on the famous Hoover Co-operative Plan.

Under this highly resultful arrangement, our trained sales organization—working closely with the dealer—secures leads, demonstrates, sells, delivers and services the machines.

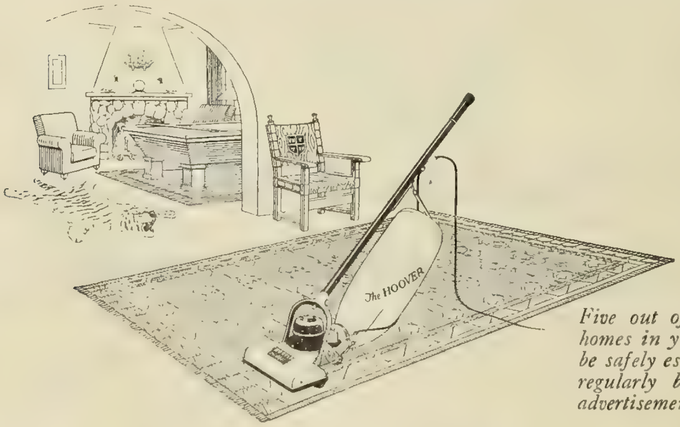
In the store of the Winnipeg Hydro Electric System a Hoover demonstration table is located on the aisle traveled by all who come in to pay their bills.

Hoover window displays and newspaper publicity are frequently employed to stimulate sales. Special Hoover sales campaigns are also vigorously conducted at different times of the year.

Whether or not you are located in a city of sufficient size to warrant adoption of the Hoover Co-operative Plan, our long and successful experience in the retail sale of electric cleaners will be gladly placed at your disposal.

Send for our representative. There is no obligation. Write us today so that you may take advantage of the Christmas season.

THE HOOVER SUCTION SWEEPER COMPANY OF CANADA, LIMITED
Factory and General Offices: Hamilton, Ontario



Five out of every seven wired homes in your locality, it may be safely estimated, are reached regularly by Hoover national advertisements

The HOOVER

MADE IN CANADA

It BEATS.... as it Sweeps as it Cleans

Electrical News
Generation, Transmission and Application of Electricity

For nearly thirty years the recognized journal for the Electrical Interests of Canada

Published Semi-Monthly By

Hugh C. MacLean Publications
LIMITED

THOMAS S. YOUNG, Toronto, Managing Director
W. R. CARR, Ph.D., Toronto, Managing Editor
HEAD OFFICE - 347 Adelaide Street West, TORONTO
Telephone A. 2700

MONTREAL - - 119 Board of Trade Bldg.
WINNIPEG - - - - 302 Travellers' Bldg.
VANCOUVER - - - - - Winch Building
NEW YORK - - - - - - 296 Broadway
CHICAGO - - - 14 West Washington St.
LONDON, ENG. - - 16 Regent Street S.W.

ADVERTISEMENTS

Orders for advertising should reach the office of publication not later than the 5th and 20th of the month. Changes in advertisements will be made whenever desired, without cost to the advertiser.

SUBSCRIPTIONS

The "Electrical News" will be mailed to subscribers in Canada, Great Britain and British possessions post free, for $2.00 per annum. United States $2.50. Other foreign countries $4.00. Single copies 15 cents. Remit by currency, registered letter, or postal order payable to Hugh C. MacLean Publications Limited.

Subscribers are requested to promptly notify the publishers of failure or delay in delivery of paper.

Authorized by the Postmaster General for Canada, for transmission as second class matter.

Vol. 31 ***Toronto, November 15, 1922*** ***No. 22***

The "Clean-up Deal"—$32,734,000

The "clean-up" deal recently consummated by the Ontario Hydro-electric Power Commission represents one of the biggest electrical transactions ever put through in North America.

The properties involved are valued at $32,734,000 and include the Toronto Power Company, Limited, Electrical Development Company, Toronto and Niagara Power Company, Toronto Electric Light Company, Toronto and York Radial Company, Schomberg and Aurora Railway. These properties are popularly known as the "Mackenzie Power Interests" and their taking over by the Hydro-electric Power Commission represents the climax of several years of negotiations.

On Dec. 3, 1920, the basis was reached for the agreement, which is now ratified. The intervening time has been required for the approval of by-laws by the electors, the passing of by-laws by council, legal framing of agreements and the clearing away of incidental matters.

Under this agreement the resignations of all the directors of companies controlled by the Toronto Railway Company, the vendor, are tendered, and the company will cause to be terminated the employment of all officers of the controlled companies and of any other persons employed.

The agreement provides for its authorization by the lieutenant-governor-in-council and the guarantee of the bonds by the province. It also provides for the suspension of litigation.

The commission is protected in the agreement from future claims on account of the transmission right of way and $4,000,000 is retained until 1924 to meet any such claims as may be proved. The commission also agrees to pay when the same become due the guaranteed debenture stock of the power company secured by deed of trust between the power company and the British Empire Trust Company. The government agrees to guarantee these bonds to the extent of $13,500,000.

The consummation of the agreement, of course, removes competition with the Hydro, automatically extinguishing the wide powers held by the Toronto Railway Company. It is unlikely that any radical change will be noticeable in the near future. Efforts are being made to retain as many as possible of the former employees and it seems likely there will be little change in this direction. The whole transaction is an evidence of the strong hold that public ownership has on the minds of Toronto voters.

A Standard Code for the Electrical Industry

On Thursday the 2nd November, about 85 members of the Manitoba Electrical Association gathered at the Fort Garry Hotel, Winnipeg, to listen to an address by Capt. R. J. Durley, secretary of the Canadian Engineering Standards Association, Ottawa, Ont. Capt. Durley outlined the plans for a Canadian National Electric Code and National Bureau of Inspection. He stated that the Standards Association has the support of the Federal Government, and the Department of Trades and Commerce, and already committees have been formed to deal with various subjects, such as electrical, cement, concrete, etc.

The subject of a National code is of great interest and importance to the whole Dominion, but those particularly interested are municipalities, power companies, engineers, architects, fire underwriters, insurance companies, manufacturers of electrical equipment, electrical jobbers and dealers, electrical railways, etc.

It is most necessary to obtain and adopt uniform requirements throughout the Dominion with regard to the design, quality, and installation of electrical appliances and equipment. This refers not only to appliances employed inside buildings, but also to the conducting systems connecting such installations with their source of supply. By having a National Code it would be the means of putting a stop to the importation of defective appliances and material.

At the present time the whole electrical industry is being put to a lot of unnecessary inconvenience and loss, on account of the variety of conditions that exist in the various provinces, as appliances and material that are regarded as satisfactory in one province, may be objected to in another. Manufacturers are called upon to produce an unnecessary number of varieties and types of material or equipment. Due to the necessity of meeting divergent local requirements, dealers and jobbers have to carry an unnecessarily large stock, with resulting expense to the public. In many cases the public are being supplied with inferior and dangerous articles, especially so in the case where the goods have been imported from a foreign country.

The formation of a Code would necessarily have to be followed by arrangements for testing, examining and approving electrical appliances at a central approving laboratory of the kind that has already been established in Toronto by the Hydro-electric Power Commission of Ontario. At such a labaratory, equipment purporting to comply with the rules adopted in any province could be examined and officially certified as satisfactory. Such work would derive additional authority if it were carried out under the auspices of the Dominion Government. Possibly activities of this kind would come within the scope of the Research Institute and Bureau of Standards which is proposed at Ottawa.

Should it be found possible to interest the provincial governments in this important question, the Canadian Engineering Standards Association, as a Dominion-wide body dealing with engineering problems of this kind, would be enabled to form a widely representative working committee to deal with the technical aspects of the case, and thus secure general agreements by consultations between representatives of various provinces and other interests concerned.

Mr. George Wright who acted as chairman then asked for opinions. L. M. Cochrane said the Province should strongly support Capt. Durley if only in the interests of the consumer, who is now penalized by the want of a code. E. V. Caton said we have the Fire Code but that does not apply to life; what we want is a National Code for Canada to make a legal standard, as today one municipality differs so much from another.

The following motion was presented by E. V. Caton, seconded by J. Rocchetti and carried unanimously:

> That the Manitoba Electrical Association is vitally interested in the work of establishing a Canadian Code and that a committee composed of Messrs. Martin, Wright, Dickson and Cambridge be appointed to confer with the Engineering Institute of Canada, Winnipeg Branch, for the purpose of having them appoint delegates to co-operate with this Association, to urge on our Provincial Government the advisability of their participating in the proposed conference at Ottawa.

L. B. Dixon said the Contractor-Dealers' Association and The Manitoba Electrical Association have been very interested in the subject of standardization. Material often approved of in Ontario is quite frequently turned down in Manitoba; therefore it had to be returned to the manufacturers. The manufacturers would certainly like to have a standard to work by. M. E. Deering said everyone should support the National Code and referred to the speaker of the last luncheon who was a layman, who stated he had about a dozen electrical appliances in his home and that no two of them had the same kind of plug. J. G. Glassco thought that there are untold advantages to be derived from the Standards Association, which body should be supported financially and not run on the same lines as the Society for the Prevention of Cruelty to Animals.

"Bus-Bar Stresses"

At the November 3rd meeting of the Toronto Section A.I.E.E., the chair was occupied by Mr. S. E. M. Henderson. Mr. Henderson in his introductory remarks reminded the members of the fact that there were two prizes for authors of papers, established by the American Institute in 1921 and both are open for competition this year. Each prize is for $100.00. He outlined the conditions for competition and urged the members to try for these prizes. The chairman also advised the meeting that the Executive of the Toronto Section passed a motion at their last meeting offering for competition among the members of the Toronto Section, a prize of $25.00 to the author of the most worthy paper on any electrical subject presented during the season of 1922-1923. The executive of the Toronto Section will be judges.

Mr. Henderson then introduced the speaker of the evening. Mr. C. H. VanAspirin of the Hydro-electric Power Commission Laboratories, who presented a paper on "Mechanical stresses in bus-bars under short circuit conditions."

Following a request to the Commission for a simple formula for stresses in bus-bars, at right angle bends, which could be readily applied—and after a vain attempt to arrive at one mathematically—Mr. VanAspirin undertook to measure the forces. His work in this connection was the substance of his paper. Many obstacles were encountered, but finally his labors met with complete success. After plotting the measured readings an equation was discovered which satisfied the curve. In order to locate bus supports to the best advantage to withstand these forces, certain constants were plotted which may be applied with the greatest of ease to suit various conditions of bus construction. In these measurements the maximum forces measured did not exceed 1/2 ounce while deflections of the order of 3/100 mils were read.

Following the paper, Mr. Dobson read a discussion by Mr. H. B. Dwight and Mr. A. H. Hull showed some slides with curves of short circuit currents and bus stresses, as calculated on the buses at Queenston generating station. Professor Rosebrugh also outlined a method by which the bus stresses at right angle bends could be calculated.

C. E. A. Proceedings are Out

The Annual Proceedings of the Ottawa Convention of the Canadian Electrical Association are just off the press and have been mailed to all the members of the Association. Non-members can obtain the book upon application to the secretary, 65 McGill College Avenue, Montreal, enclosing one dollar, the cost of printing. It is the largest book issued as yet by the C.E.A., containing 221 pages of papers and discussion of the following reports: Report of Membership Committee; Report of Committee on Public Relations; Report of Commercial Section; Report of Power Sales Bureau; Report of Merchandise Sales Bureau; Report of Lighting Sales Bureau; Report of Meter Committee; Report of Electrical Apparatus Committee; Report of Underground Systems Committee; Report of Overhead Systems Committee; Report of Lamp Committee; Report of the Accounting Section; Report of Classification of Accounts (National Section); Report of Accident Prevention Committee; Report of the Inductive Interference Committee; Report of Rural Lines Committee; Report of Canadian Member Rural Lines Ct'ee. of N.E.L.A.

The reports are well illustrated by photographs and charts making it a very valuable reference book

Besides, it contains also a valuable paper of Mr. Samuel G. Hibben, illuminating engineer of the Westinghouse Co., on "Fundamental Principles of Illumination," a stimulating address by president Julian C. Smith, and an address of Mr. Frank W. Smith, president of the National Electric Light Association; also addresses by Hon. Walter Mitchell and Lawrence W. Davis, special representative of the National Contractor-Dealers Association, New York, on the problems of the electrical contractor-dealer as affecting the electrical industry.

British Industries Fair

The British Industries 1923 Fair, the annual exhibit established in 1915 and held simultaneously at London and Birmingham, will be open from February 19 to March 2. This is the trade buyers' annual opportunity to inspect the products of Empire manufacture. It is not an exhibition in the ordinary sense; it is a Trade Fair to which admittance can only be gained by trade buyers. Everybody at the Fair, consequently, will be there on business and exhibitors and buyers will be able to transact their affair unhampered by crowds of sightseers. This Fair will embody all that is best in British industrial effort.

The Application of Electricity in the Manufacturing Industry--10

Steel Industry Highly Electrified—Blooming Mill Drive Involves Specialized Application of Electric Motors—Comparison of Steam and Electrically Driven Mills—Material Handling by Electricity*

Electrification has proceeded rapidly in the steel industry. At the present time the modern steel mill is 95 per cent electrified. This desirable condition is the direct result of unfavorable operating conditions for steel manufacture. Close competition has compelled the strictest scrutiny of costs with the result that electric drive has been almost universally adopted.

This widespread electrification, applying to the most varied operations of steel manufacture and including practically all the known uses of electric power, presents such a broad subject that it is impossible to give even an adequate summary of it in a single article. It is proposed, therefore, to deal only with the more outstanding applications.

Blooming Mill Drive

The discussion of blooming mill drive is inevitably a statement of the advantages of electric drive over steam engine drive. It is to be noted that in the past, adequate figures for comparison have not been available; recently, however, actual statistics have been compiled and seem to show considerable advantage for the electric motor.

It is authoritatively stated for one particular installation that 1090 pounds of steam were used per ton of steel rolled. Electrification was proceeded with and it was found that even during intermittent operation, only 25 kw.h. of electricity were used per ton of steel rolled. On the basis of 14 pounds of steam per kw.h. generated, this is equivalent to 336 pounds of steam per ton rolled.

Blast Furnace plant of Algoma Steel Corporation, Sault Ste. Marie, Ont., showing electrically operated ore bridges, ore distributing cars and furnace charging skip hoists

The change from steam to electric drive involves the substitution of an equivalent for the reversing engine which is used to drive the mill. This is sometimes done by the installation of a flywheel motor-generator set driving a direct-current motor connected to the rolls. In such installations the main roll motor has to be of special construction to withstand the severe shocks of reversing service. Large quantities of air are used, generally furnished, washed and cooled by spray conditioning apparatus. This air is sometimes taken up from the pit underneath, through a casing over the back of the armature and discharged at the commutator end.

In Atlantic Steel Company's Plant

In the plant of the Atlantic Steel Company, the reversing roll motor, which is compound wound (equivalent) has two separately excited fields fed from a three unit motor-generator set, which has a 50 h.p. 2,200 volt induction motor driving a 25 kw. 125 volt, direct-current constant potential generator, and a 75 kw. direct-current generator supplying the series winding on the roll motor fields. The voltage of the latter is proportional to the motor armature current.

The armature leads are connected through a circuit breaker, to the armature leads of the generator on the flywheel-motor-generator set. This generator is an 1,800 kw. machine of the same characteristics as the main motor, and has its fields separately excited from the 25 kw. generator. On the same shaft is a 1,600 h.p. three phase, 60 cycle, 2,200 volt, slip ring induction motor, and a 60,000 lb. flywheel built up of boiler plate. The synchronous speed of this set is 514 r.p.m.

The switchboard panels are for controlling the induction motor on the motor-generator set, exciter and air washer, and for direct current from the two exciter generators. A circuit breaker panel is placed between the main motor and generator. Control of the speed and direction of the roll motor is by means of a panel board of contactors and relays, which operate the fields of the motor and its generators. Mounted in the mill operator's pulpit is the master controller, a small single-lever affair, with an indicating board showing the voltage and load in the mill motor. Connection to the mill is made through universal joint couplings, a 30 in. helical cut tooth pinion set, and universal joint couplings on spindles,

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*For certain of the information contained in this article we are indebted to papers before a recent convention of the association of Iron and Steel Electrical Engineers; photos courtesy Algoma Steel Corporation.

All of the electrical apparatus and the pinions are enclosed in a separate steel building to keep out dust and scale.

Wiring to the Mill

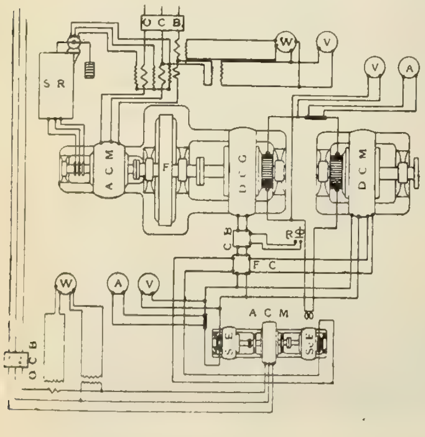
Power lines are brought in underground in lead cable and distributed to various plant circuits through oil circuit breaker panels, with ammeters and watthour meters which give the basis for power charge to various departments. All wiring for the high tension circuits in the motor room is in fibre conduit set in concrete, while all low-tension wiring is in iron conduit.

Connections between the motor and the generator are made with bus-bar copper in a concrete tank with an iron cover. These bus-bars are supported on heavy insulators and braced at frequent intervals with strain insulators to prevent distortion due to sudden rushes of current. Ventilating air is carried through a waterproof concrete tunnel.

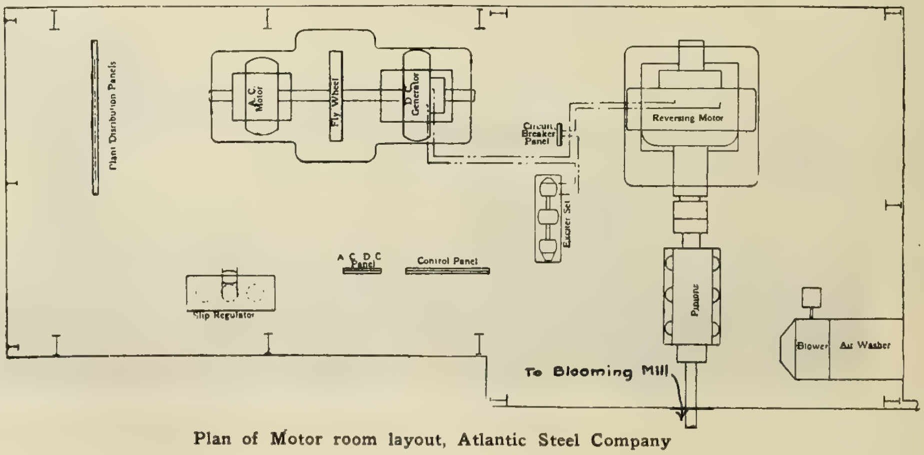
Layout of Motor Room and Blooming Mill

The layout of the motor room and blooming mill is given in Fig. 2. With the flywheel up to speed, and the exciter and blowers running, the cycle of operations is the same as is used in the operation of compound-wound reversing motor. The connections are shown in Fig. 2. Closing the circuit breaker between the roll motor and the generator causes the contactors automatically to excite the roll motor to full shunt field strength. At this time the flywheel generator has no field, consequently no voltage.

When the pulpit operator throws his master controller on one point, it closes contactors on the control panel which puts field current, in service with resistance, in the generator fields. The voltage builds up rapidly and the motor begins to revolve. Further steps on the master controller cut resistance out of the generator field until the voltage of generator reaches 600 volts. At this point the motor has full field and maximum torque with a speed of 70 r.p.m. Speeds above this are obtained by other points on the master, which open contactors, inserting resistance in the motor fields until the maximum speed is reached. The usual operation, however, is to put the master on the first point, and when the rolls bite, to throw the lever to the full speed position. On short passes, the piece is through the rolls before maximum speed is reached. In any pass, should excessive speed for the draft occur, a relay will strengthen the field of the motor, limiting the load to a safe value. This is rarely needed except with cold steel or cold spots in ingots or trying to take too heavy a draft.



Schematic diagram of connections for reversing blooming mill, Atlantic Steel Co.



Plan of Motor room layout, Atlantic Steel Company

Comparison of Steam and Electric Drive

Since this mill has been driven both by steam and electric motor, it is interesting to make some comparisons of operation, the power costs, delays and the like. Data on the engine is available for 10 years, but the years 1915-1920 have been taken as representative. The electrical data is for six months in 1921, and six months in 1922. In 1921 the mill could not be run to capacity, due to a shortage of ingots, but in 1922 this feature has almost disappeared. Both drives have operated with the same equipment, with exception of a new soaking pit crane which replaced the old one in 1921. Nearly all operation of both drives has been single turn of 10 or 12 hours. Turns are figured on a twelve hour basis in all calculations. In figuring steam cost in Table 1, 25 per cent of the actual steam was credited to the engine and charged to the turbines. The steam used was about 1060 lbs. per ton of steel, while the average power per ton of steel is about 24 kw. Table 1 gives a good comparison, as the year 1915 was good in tonnage and cost. In this mill there is now no question as to the superiority of electric drive.

Table 1—Blooming Mill Operating Data

Drive	Year	Per cent Power cost per ton	Per cent Repair cost to drive per ton	Per cent Delays per ton caused by drive	Per cent Tonnage per turn	Per cent Cost of attendance per ton
Steam	1915	100	100	100	100	100
Steam	1916	106	187	123	91	110
Steam	1917	161	224	140	82	115
Steam	1918	189	280	195	87	150
Steam	1919	192	184	119	99	168
Steam	1920	263	180	139	97	180
Elect. 6 mo.	1921	52	48	60	107	84
Elect. 6 mo.	1922	48	38	28	125	72

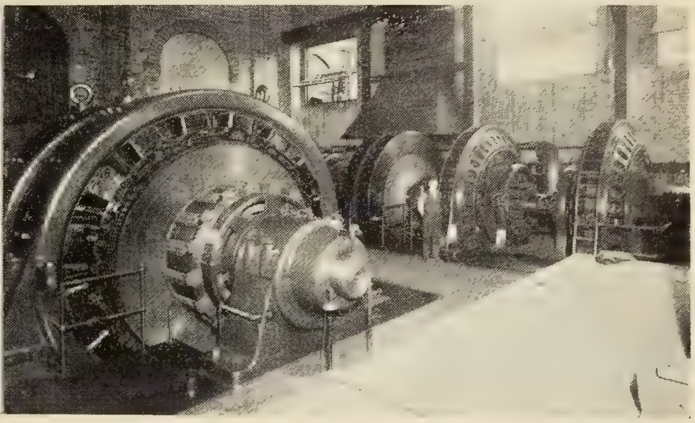
Repair and Upkeep

Repair and upkeep cost of the electrical apparatus, is much less than on the engine. Not only does the force actually at work consist of less men, and the time put in less hours, but also the shops are not so busy making spare parts, nor is the overhauling gang in demand at regular intervals. As to delays, the electrical equipment has a decided advantage. The engine was a constant source of trouble and delays were looked for as an unpleasant necessity. The electrical delays have been very few, consisting mostly of switches stuck in, or coils burnt open, or fuses out, causing only a few moments stop. The most serious stop was chargeable to faulty installation. There was a three hour stop to pump water out of the ventilating air duct for the reversing motor on starting up at the beginning of a week's run. This air duct was afterward water proofed as it was found that continued wet weather would saturate the soil enough to soak through the concrete duct.

Greater Tonnage Obtained

Although the engineer on the old drive is now the motor operator on the blooming mill, it has been found that it requires a man much less skilled than with the engine, and the question of having a man to take the engineer's place in his absence is not so vital as formerly. In fact there is being installed a foot-operated master controller which will be worked by the roller, and cut out one man from the pulpit crew. With the motor the speed is practically constant, and there is no danger of overspeeding, even if the operator does not move his lever. The fatigue of the operator is also a factor, for the difference between pulling the engine lever and the electrical controller is quite marked.

Motor operated tilting, travelling roller tables serving 28" rail mill Algoma Steel Corporation



4000 h.p., 600 volt, d.c. motors and fly wheel motor generator set, driving 35 in. blooming mill, Algoma Steel Corporation

Many Advantages

With electric drive, the losses stop when the turn is over. At the opening of the switch the consumption of energy ceases. How different this is from the steam line, with its leaks always ready to start and condensation taking its toll of coal every second.

It it of great advantage to be able to place the mills in the best relation to other mills and yard facilities. With the electric drive this can readily be done, as transmission lines are not costly, and transmission losses are almost negligible in comparison with long steam lines.

Not nearly as much money tied up in spares and renewals with the motor. A large part of the electrical spares for the blooming mill are identical with parts for other electrical equipment in the plant. This condition allows the same spares to cover a lot of equipment, reducing the total amount invested in spare parts.

The electrical blooming mill combined with other main electric drives, gives an opportunity to use a large amount of powed, handled conveniently. Large amounts of power can be generated more economically by large units than by small. The steel mill has the choice of generating power at a low steam consumption by the use of large turbines, steam being produced by coal, waste heat boilers or blast furnace gas.

Material Heating

One of our photographs shows part of the ore handling equipment of the Algoma Steel Corporation, including ore bridges, ore distributing cars and furnace hanging ship hoists, all electrically operated.

In this as in other plants, ore bridges are extensively used to convey ore and stone from boat or trough to stock piles and bins. In the smaller plants a single unit is installed, hence reliability is important. Direct-current motors are almost always used for ore bridges and unloaders. Their principal points of advantage are as follows:—

(1) Accurate dynamic braking control can be obtained on the hoist motion with greatest simplicity.

(2) The motors required for hoist and trolley motions can be considerably lighter, due to the high starting torques developed by series motors. This feature has a material influence on the weight of the bridge structure.

(3) Direct-current magnetic control, in general, is superior to alternating-current control in flexibility and performance, is more compact and is lighter in weight.

(4) Fewer collectors are required.

Two general methods of hoist drive are in excessive use. The more common system utilizes one motor for the holding line and one motor for the closing line of the grab bucket, these being independently controlled. In the other system one motor is used. This motor drives the closing line drum through a clutch. The single motor arrangement operates very satisfactorily, also and has the advantage that full motor capacity is available for closing the bucket, if required.

Transfer cars and scale cars are to be found at most furnaces. Direct-current railway motors are best suited for these units, due largely to their mechanical adaptability. There are, however, a few successful alternating-current installations using wound-rotor motors. The ordinary induction motor is not very well suited for gearing to an axle under a car. The tendency is to gear these cars for too nigh speeds. Ordinarily the distances travelled are short and the service more or less of a spotting character.

Skip Hoists

As with the Algoma Steel Corporation, practically all the large plants are equipped with electric hoists, but in many of the smaller plants there is a tendency to prefer the steam hoists, which is lower in first cost and requires somewhat less floor space.

The great majority of skip hoists are operated by direct-current motors but there are a few alternating-current installations. The latter drive is similar to the single motor, geared direct-current hoists. The motor has two stator windings and two rotor windings, arranged for different numbers of poles to give two distinct running speeds. These speeds have a ratio of about 6 to 1, being respectively about 300 feet. and 50 feet per minute, Magnetic control is provided for reversing and cutting over the primary winding and for adjusting the secondary resistance. The travel is at the higher speed and slow down is obtained by transfer to the low speed winding, causing a negative torque momentarily. The control is by limit switch and the protective features are similar to those of the direct-current hoist.

Lighting of Steel Mills

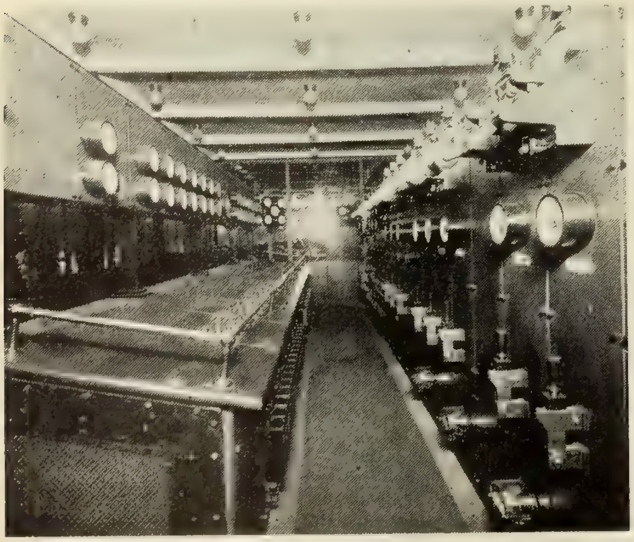
Steel mill lighting presents a problem requiring special treatment in order to insure economical and efficient illumination. The first consideration is the quantity of light required. Tables which give the foot-candle values which experience has found desirable for the various operations and locations are supplied by many manufacturers. A range has been given in each case, as it is impossible to set a definite value owing to the influence of local requirements and surroundings upon the illumination necessary. Light colored walls, stationary objects or rough work may permit the use of the lower value. Dark surroundings, smoky, dusty atmospheric conditions rapidly moving machinery or prevalent accident hazards, however, call for the higher foot-candle illumination.

The Placing of Lighting Units

The location of outlets is naturally determined to a large extent by the proportions of the building, the size of bays and the ceiling height, bearing in mind that the position of the machinery is an important factor to consider in the placing of the outlets to insure the proper direction of light on the work.

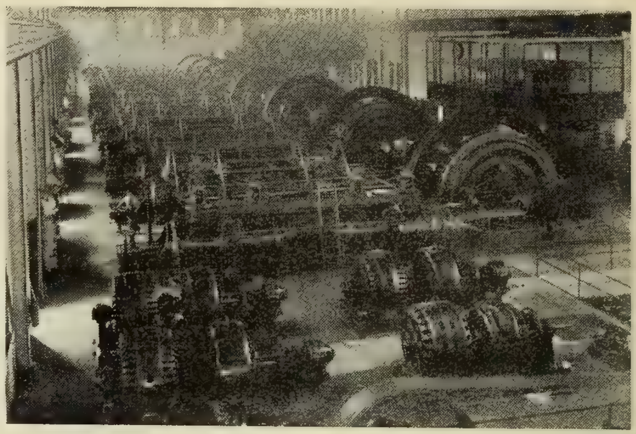
In order to reduce the number of outlets to a minimum and to utilize the more efficient higher wattage lamps, the lighting fixtures should be mounted as high as possible. Customary practice is to mount the equipment either on the under side of the truss or to suspend the units on a level with the bottom of the trusses.

In long narrow buildings where the width is equal to or less than the height of the ceiling, one row of outlets down the centre ordinarily will prove satisfactory. If, however, machinery is located near the walls, two rows of units should be provided. In buildings where the width exceeds the height, the longitudinal rows should be so located that the distance between them does not exceed one and one-half times the distance of the light source to the floor. This same proportion applies to the outlets in each row, locating them if possible symmetrically with reference to the bays into which the trusses of the building naturally divide it.



Switchboard in blast furnace gas engine power house
Algoma Steel Corporation

In buildings with extremely high ceilings, exceeding the width, the mounting of light sources on the trusses would result in a considerable portion of the light rays striking the upper section of the walls. With ordinary conditions of dark and dirty walls, the light reflection is so low that the resultant illumination is inefficient. In such cases angle reflectors, as shown in Fig. 2, mounted not less than twenty-five feet high along each side wall, will provide an excellent installation. They should be spaced not farther apart than one and one-half times their height above the floor. With the overhead equipment, that may of necessity be above a crane, these angle reflectors mounted under the crane rails will supplement the general illumination, aiding especially that on the vertical surfaces.



Blast furnace gas engine power house at plant of Algoma Steel Corp.

Types of Reflectors

Direct lighting is, of course, the most economical for steel mill work, supplied by the larger lamps fitted preferably with porcelain enameled steel reflectors. These are more durable than the glass units although the latter may have a trifle higher initial efficiency. The enameled steel is not affected by moisture, ordinary atmospheric conditions, or acid fumes. It also has the advantage of being easily cleaned and will naturally withstand relatively rough service.

Electrified Mill is Cheaper

In itself the equipment and power cost of the electrified mills may not be lower than the same items for mechanical and steam operation, but when all production figures are considered the electrified mill is cheapest. The efficiency of the electrified system, the knowledge of production costs made possible by electrical operation, the flexibility of the installation and the possibility of adjustable speed control are great assets to the electrified mill. J. S. Unger, Carnegie Steel Company, declared that the steel industry would be completely electrified by 1950. The modern steel mill today is approximately 95 per cent electrified; while the industry as a whole is probably not more than 50 per cent electrified. It seems reasonable to predict that within the next ten years the percentage of electrification will increase to 75 per cent of the total. The trend of steel mill practice strongly proclaims that the electrical way is the best way.

Completion of the transmission line for the Dryden Paper Co., of Dryden, Ont., from their present paper plant to their new power plant at Wainwright Falls, a distance of about four miles, is announced. This development is to supply power to the new addition, and to the town.

The Heineman Co., of New York, have brought out a radio lightning arrestor which is approved of by the National Board of Fire Underwriters, under approval number 5872; they are available from all leading jobbers.

A Survey of Residence Lighting

Results of a Census of 1500 Middle-Class Homes—Detailed View of Conditions Obtained—Degree of Saturation of Wiring and Lighting Equipment

By A. M. LUCKIESH*

It does not require extensive observations to conclude that a large percentage of homes is inadequately and improperly illuminated and that the average householder is unconscious of many of the possibilities of modern lighting. That the public has not been convinced of the importance and possibilities of lighting is proved by the lighting conditions in the homes to-day. It is known in a general way that residence lighting is deficient and defective, but little is known of the details. To obtain detailed information of existing conditions a survey was planned.

The primary aim of the first part of the survey was to obtain detailed information of the average conditions in the middle-class homes. It is difficult to define the so-called "middle-class" but it has been assumed to be a group larger than the "low-class" and the "high-class" groups of homes. The data upon which this paper is based were obtained from analyses of detailed surveys of about 1,500 homes in a number of cities in various parts of the country. The form used was 8½ inches by 14 inches which was found to be a convenient size. Four questions were asked and following these was a description of the types of ceiling-fixtures designated by letters. This was followed by letters indicating the material which shades or envelops the light-sources. A ruled form provided horizontal rows of spaces for recording the data for each room. Vertical columns were provided for ceiling-fixtures, portable lamps, and wall-brackets and data requested for each of these classes of fixtures for each room. These data pertained to the number and type of fixtures, the material of shade, total number of sockets, and total wattage. A column was also provided for the number of convenience outlets in each room and one for floor dimensions.

The "Conservative Ideal" Average Middle-Class Home

The survey not only yields the details of wiring and of lighting but provides an average home as to size or number of rooms. This is made use of by designing conservative but adequate and proper wiring and lighting for this theoretical average home and ascertaining the difference between the actual conditions and those in the "conservative ideal" home. The average home may be wired and equipped in various ways and in the following paragraphs general descriptions and summaries are presented. These form a basis for computing the standings of various items considered in the survey. No detailed description of the fixtures and portables are presented for these are assumed to be equipped with proper shades, etc., to satisfy the requirements of good lighting.

Living-room

General lighting from a shower, or from "direct-indirect" portables, could utilize 200-watts. A table-lamp, a floor-lamp, a small piano or desk lamp, and two small decorative portables can account for 340 watts. This is a total of 540 watts all of which, of course, would seldom be used at one time. If decorative brackets were used the general lighting or decorative portables might be reduced accordingly. Three convenience outlets are specified.

Dining-room

In the case of a shower, lamps aggregating 150 to 200 watts in deep dense shades could provide general lighting and from 30 to 100 watts in decorative portables or brackets. A total of 230 watts is assumed to be desirable. One convenience outlet is specified.

Kitchen

A 100-watt lamp in the central fixture is assumed to be a desirable average. This would be a 150-watt if a "daylight" lamp is used. Two auxiliary brackets or other sockets would easily account for 80 watts. It appears safe to assume a total of 180 watts as desirable. One convenience outlet is specified.

Bedroom

A central fixture using 50 watts, two brackets or dresser lamps using 50 watts, and a bed lamp of 40 watts makes an aggregate of 140 watts. This wattage may easily be distributed in two brackets and a portable without considering a ceiling-fixture. One convenience outlet is specified in each of three bedrooms.

Bathroom

One bracket on each side of the mirror and each containing a 50-watt lamp accounts for 100 watts. One convenience outlet is specified.

Basement

Assuming a 100-watt lamp or a 150 watt "daylight" lamp over the laundry trays and four other outlets distributed in locker, over work-bench, near heater, in coal bin, in toilet, etc., it is easy to account for a total of 300 watts.

Convenience outlets

A total of nine is assumed, thus providing an average of one per room with two extra for the living-room.

Portables

A total of eight is assumed; these include the small decorative portables.

Wall-brackets

A total of nine is assumed; these can easily be accounted for from a purely utilitarian standpoint without considering any decorative brackets in the living or dining-room. Two in each bedroom, two in the bathroom, and one in the kitchen account for nine.

Ceiling-fixtures

An average of one per room is quite, if not more than sufficient.

Total wattage

A total of 1,770 watts in these various rooms is assumed.

Material of Shades

The material which shades or envelopes the light-sources is designated in the survey as follows:

G—Glassware, S—Silk or other woven fabric, P—Parchment, M—Metal, N—No shade.

No questions were asked as to the characteristics of the glassware, that is, whether clear, frosted, highly diffusing, etc., because of the risk of making the survey-form too complex.

The percentage of the various materials in use for shading, reflecting, and diffusing are presented in Table I for the various classes of fixtures, in the various rooms. The horizontal rows of percentages should equal 100.

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*Before I.E.S., Swampscott, Mass.

Table I.—Materials in Use For Shading, Reflecting or Diffusing Light in the Middle-Class Home.

	Percentage				
	Glass	Silk	Parchment	Metal	None
Living-room					
Ceiling-fixtures	85	6	1	1	7
Wall-brackets	48	19	11	1	21
Portables	32	57	6	4	1
Dining-room					
Ceiling-fiixtures	88	3	1	1	7
Wall-brackets	56	13	8	—	23
Portables	44	38	11	4	3
Kitchen					
Ceiling-fixtures	76	—	—	3	21
Wall-brackets	60	1	—	1	38
Bed-rooms					
Ceiling-fixtures	89	1	—	—	10
Wall-brackets	77	10	1	—	12
Portables	35	46	8	10	1
Bath-room					
Ceiling-fixtures	80	—	—	1	19
Wall-brackets	85	—	—	1	14
Totals					
Basement sockets	10	—	—	3	87
Ceiling-fixtures	85	2	—	1	12
Wall-brackets	73	7	3	—	17
Portables	34	52	7	6	1

It will be noted that 12 per cent of the ceiling-fixtures and 17 per cent of the wall-brackets have no shades. The candelabra and other fixtures designed for round-bulb lamps are responsible for much of these percentages. There is missionary work to be done in equipping these "round-bulb" fixtures with shades. There are holders available now for these fixtures which do not have holders attached. Some of these holders are held in place by screwing the lamp into the socket thus making it possible for anyone to equip these fixtures with shades. The basement is also open for missionary work, especially in the case of sufficient and proper lighting for the laundry trays.

There is an appreciable percentage of all fixtures in all rooms not equipped with shades. Glass is the predominant material excepting in the case of portables. Here silk predominates.

Fixtures

There is more or less confusion and indefiniteness in the use of names of fixtures. For the purpose of the survey it was necessary to adopt simple definitions but not too many of them. The definitions used on the survey-form are presented herewith.

The lighting equipment is divided into three classes of fixtures, namely ceiling-fixtures, wall-brackets, and portables. These are then subdivided into types such as shower, etc.

The ceiling-fixtures are designated in the survey-form by their initials and are defined as follows:

B—Bowl—A fixture consisting of a bowl usually open at the top and hung from the ceiling.

S—Shower—A fixture, suspended from the ceiling, in which a number of incandescent lamps are hung in a downward position.

BS—Bowl-Shower—A bowl and a shower combined in a single fixture.

C—Candelabra—A fixture suspended from the ceiling in which a number of incandescent lamps are mounted in an upright position on "imitation" candles.

DC—Drop-cord—A fixture consisting usually of cord suspended from the ceiling with one socket attached.

R—Rosette—A fixture consisting of a plate attached to the ceiling on which is mounted one or more collars or rosettes each containing a socket.

BL—Ball—A fixture of totally enclosing glass or other material, regardless of shape, which is hung at the ceiling.

D—Dome—A fixture consisting of a large shade, suspended from the ceiling, with a wide opening at the bottom which emits light downward. This unit is the reverse of a bowl.

The percentages of various types of ceiling-fixtures found in the various rooms of the urban middle-class home are presented in Table II. There data show the tendencies of the past. We know from dealers' stocks what the present tendencies are.

Table II.—Various Types of Ceiling-Fixtures in the Various Rooms of the Middle-Class Home.

	Percentages				
Classification	Living-room	Dining-room	Kitchen	Bed-room	Bath
Bowl	16	21	3	10	4
Shower	58	42	6	23	3
Bowl-shower	11	12	—	—	—
Candelabra	3	7	—	—	—
Drop-cord	3	4	71	46	63
Rosette	7	4	10	15	18
Ball	1	1	3	5	11
Dome	1	9	7	1	1
	100	100	100	100	100

The average number of ceiling-fixtures, the average number of sockets per fixture, and the average watts per socket, for the various rooms are presented in Table III.

Table III.—Ceiling-Fixtures in the MiddleClass Home

Type of Room	Fixtures per room	Sockets per fixture	Watts per socket
Living-room	1.0	2.8	41
Dining-room	1.0	3.4	40
Kitchen	1.1	1.1	59
Bed-room	0.8	1.3	43
Bath-room	0.5	1.0	51
Average	0.88	1.92	47

The average number of ceiling-fixtures per home is 5.4.

It is seen that there is an average of nearly one ceiling-fixture per room. This is as many as necessary for satisfactory lighting. Many of these are antiquated and should be replaced by modern fixtures but the rehabilitation of these old fixtures can be accomplished in many cases by installing new shades. It is interesting to note the predominance of the multi-socket fixture in living and dining-rooms. The dome, if well designed, is one of the best fixtures for illuminating the dining-table, still it is used in only nine per cent of the dining-rooms. In some other rooms a type of fixture is used which was classified as a dome.

Wall-Brackets

There are many excellent uses for wall-brackets such as flanking mirrors in bedrooms and bathrooms. Brackets are also useful in the kitchen. Data pertaining to brackets are presented in Table IV from which it is seen that there is an average of only 0.37 bracket per room and only 2.6 brackets per home. Wall-brackets are not sufficiently used in bedrooms, bathrooms, and kitchens to meet the requirements of adequate and proper lighting. Allowing nine wall-brackets in the "conservative ideal" average home it is seen that this item is 29 per cent of saturation.

Table IV.—Wall-Brackets in the Various Rooms of the Middle-Class Home.

Type of room	Fixtures per room	Sockets per fixture	Watts per socket
Living-room	0.40	1.2	34
Dining-room	0.21	1.3	31
Kitchen	0.17	1.0	35
Bed-room	0.45	1.1	40
Bath-room	0.63	1.0	45
Average	0.37	1.12	37

Portable Lamps

The portable lamp has many advantages in residence lighting as well as many applications. If properly designed for each purpose it can go far toward solving most of the lighting problems in the home. Its decorative value and its portability are pre-eminent characteristics. It represents the best solution of lighting problems for the renter in many cases. Of course it requires a convenience outlet and these are far too rare. However, it is relatively easy to install convenience outlets and the cost of a convenience outlet is less than that of a fixture. The landlord should be more easily persuaded to supply such outlets in the inadequately wired and illuminated apartment than to add more fixtures. Furthermore a single convenience outlet can be made a distribution centre for several portables. From every angle the portable lamp has many advantages and it appears that its present popularity will greatly increase. In fact if the manufacturer would supply portable lamps and portable brackets each properly designed for a definite lighting purpose, residence wiring and lighting could be solved largely by convenience outlets and portables respectively. In Table V data pertaining to portable lamps are presented.

Table V.—Portable Lamps in the Middle-Class Home.

Type of room	Portable per room	Sockets per portable	Watts per socket
Living-room	0.95	1.7	42
Dining-room	0.12	1.4	37
Bed-room	0.14	1.1	40
	——	—	—
Average	0.40	1.4	40

An average of 1.6 portables per home is found in the middle-class home. In the "conservative ideal" average home eight portables including the small decorative ones, have been provided. This indicates 20 per cent saturation.

Convenience Outlets

One of the most deplorable phases of the wiring of homes is the paucity of convenience outlets. When it is considered that, besides providing for the use of portables, convenience outlets extend their usefulness to the many electric appliances, it appears that there should be at least one in each room and at least two or three in the living-room. In the "modern electric homes" of average size as many as forty such outlets have been provided. In the "conservative ideal" average home nine convenience outlets have been allowed. The survey of the middle-class home reveals an average of 2.5 convenience outlets, therefore in terms of the "conservative ideal" this item is only 28 per cent of saturation.

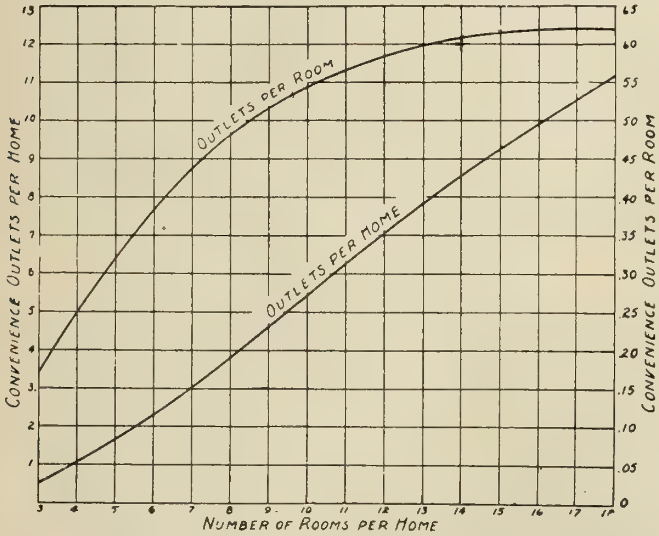


Fig. 4—The influence of size of home on number of convenience outlets

In Figure 4 are shown the average number of convenience outlets per home and per room for homes of various sizes.

It is seen that the number of convenience outlets increases directly with the size but the number per room reaches a fairly steady value for sizes greater than the average home. Of the total number of convenience outlets; 71 per cent were found in homes having from six to nine rooms, and 83 per cent in homes having from five to ten rooms. Of course this is largely due to the fact that most of the homes are found to be within these ranges.

Wattage

The average watts per socket is in general fairly satisfactory. These are shown in Tables III, IV, and V. The wattage in certain sockets such as in the kitchen, should be considerably increased. With the exception of the purely decorative brackets and portables the watts per socket should be somewhat increased to secure adequate lighting with proper diffusing shades, etc. But the total wattage of the average home falls far short of the total in the so-called "conservative ideal" average home. This is chiefly due to the inadequate number of sockets in the average home to provide convenient, adequate and proper lighting.

In Figure 5 are presented the average total wattage per home and per room for homes of various sizes.

The average total wattage of lamps per home found in the middle-class homes is 863 watts, including hallways, etc. This is an average of all sizes of homes surveyed.

The average total wattage of lamps per home found in the rooms and basement, exclusive of hallways, etc., is 734 watts. This is an average of all sizes of homes surveyed.

The total wattage allowed in the rooms and basement of the "conservative ideal" seven-room house is 1,770 watts. From the data obtained it is found that the average total wattage per home, corrected to a seven-room house in order to be comparable with the wattage of the "conservative ideal," is 812 watts. Therefore by dividing 812 by 1,770 it is found that the average wattage per home is 46 per cent of that required for adequate and proper lighting as represented in the "conservative ideal" home.

This does not mean a similar increase in the consumption of energy for lighting. It is estimated that the energy consumption for lighting would be increased from 50 to 100 per cent if wiring and lighting equipment were brought up to the standard used in these computations.

The average total wattages in various rooms compared with the wattages allowed in the "conservative ideal" are presented in Table VI.

Table VI.—Average Total Wattage in Various Rooms Compared With Desirable Total Wattage.

Type of room	Actual wattage	Desirable wattage
Living-room	234	540
Dining-room	150	230
Kitchen	76	180
Bed-room	67	140
Bath-room	57	100
Basement	94	300

Number of Sockets Per Home

From such data as already presented it has been found that the average total number of sockets represented in the six rooms including living-room, dining-room, kitchen, bedroom, bathroom, and basement is seventeen. Adding to this two more bedrooms and we have twenty sockets exclusive of halls, porches, etc. Allowing four sockets for the other places we have a total of twenty-four sockets in the average middle-class home.

Per Cent Saturation

Assuming that the survey has shown the average conditions of wiring and lighting in the middle-class home it is possible by using the values of the various items of wiring and lighting equipment in the "conservative ideal" home to compute the status of the various items or the per cent saturation. That the data represents the average conditions in the middle-class home sufficiently closely for the present purpose is indicated by the inappreciable differences in the values of the various items in a summary of 800 homes as compared with a summary of the second similar group. Furthermore the survey has been conducted in about twenty cities throughout the country. Data on a few homes were obtained in many other places. Furthermore it appears that the lower-class home is even less adequately wired and lighted than the middle-class home. Therefore the percentages of saturation presented in Table VII should be conservative when applied to the eight million wired homes.

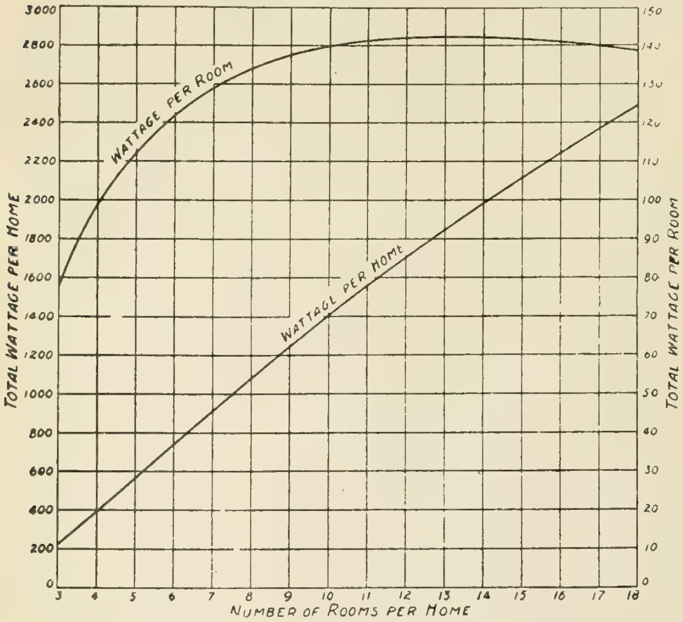


Fig. 5—The influence of size of home on wattage

Table VII.—Percentage of Complete Saturation of Various Phases of the Average Middle-Class Wired Home.

Items	Per cent
Total wattage of lamps	46
Convenience outlets	28
Portable lamps	20
Wall-brackets	29
Ceiling-fixtures	100

Conclusions

Inasmuch as conclusions readily can be drawn from the data only a few will be pointed out here.

The most popular rented middle-class home has about six rooms. The most popular middle-class home occupied by the owner has about seven rooms. More than 80 per cent of the homes having six or less rooms are rented. More than 80 per cent of the homes having more than seven rooms are occupied by the owner. There is a very marked transition from predominantly rented to predominantly occupied by the owner in passing from the six-room to the seven-room house. The number of "rented" homes approximately equals the number of "owned" homes.

Glass predominates among the shades and diffusing media used on fixtures. Silk predominates on portables. Parchment is used only to a relatively small extent

From 7 to 21 per cent of the ceiling-fixtures in various rooms of the middle-class home do not have shades. From 12 to 38 per cent of the wall-brackets in various rooms have no shades.

The use of ceiling-fixtures is as extensive as can be justified.

Wall-brackets are much less plentiful than they should be. An increase of 250 per cent in the number of utilitarian wall-brackets appears justifiable.

Considering their advantages the use of portable lamps is much less than it should be. An increase of 400 per cent appears justifiable.

The well-known scarcity of convenience outlets is verified. An increase of 250 per cent is justifiable.

The average total wattage per home is less than half what it should be to provide adequate and proper lighting. The average watts per socket is fairly satisfactory although it could be increased somewhat with justification. The sockets in the portables and wall-brackets which should be added to the average home in order to secure desirable lighting represent the desired increase in wattage to a large extent.

The average total watts and the average number of convenience outlets per home increases almost directly with the total number of rooms. This is true for the average watts per room and average number of convenience outlets per room for the smaller homes but these items appear to approach a constant value for the larger homes.

The wiring and lighting equipment in the rented home is marked by inferiority to that in the home occupied by the owner.

There is an average of about 24 sockets in the middle-class homes. The wiring and lighting equipment of the low-class home is very much inferior to that of the middle-class home. The deficiency is particularly marked by a nearly total absence of convenience outlets, portables, and wall-brackets, and by the large percentage of unshaded lamps. From 26 to 56 per cent of the fixtures, exclusive of the basement, were found to have no shades.

From the standpoint of an adequately and properly wired and equipped average middle-class home the average wired home to-day might be said to be less than "half lighted."

In this paper summaries of pertinent data yielded by the survey thus far have been presented. Data pertaining to many other phases are already available and other angles are being investigated. The survey is still in progress and will likely be continued for some time.

The author acknowledges his indebtedness to Mrs. H. O. Fullerton, Mr. H. H. Kirby, and Mr. H. A. Fellows for analyzing the survey-forms and to many who kindly assisted in distributing and in collecting the forms. Among the latter he wishes particularly to thank the departments at Nela Park, various factory-managers of the National Lamp Works, Mr. G. B. Regar, Mr. C. M. Masson, Mr. C. H. Ferris of the Illuminating Glassware Guild, and Mr. J. E. North of the Cleveland Electrical League.

Reg. Smith Sales Manager

J. A. Gibson, has just been appointed western manager of the Benjamin Electric Company in succession to Mr. Reg. Smith who has been appointed sales manager of the company at Toronto. Mr. Gibson has been working on the city sales in Toronto for some time for the same company. Previous to this he spent two years with the Northern Electric Co. at Toronto, and was also connected with the Westinghouse Electric & Manufacturing Co., in the western states. Mr. Gibson has a good knowledge of western conditions, as he was born and educated at Morden, Manitoba, and has travelled the Manitoba and Saskatchewan territory for five years. The western office of the Benjamin Electric Co. is located in the Confederation Life Block, Winnipeg.

BETTER MERCHANDISING

A Page From a Wiring Salesman's Diary

Only One Way to Get Business—Go-Get-It! The Consumers are all Set and Ready but—If You Want Fruit You Must Pick It Yourself

Houses are being built by thousands. Every one is a home and 100 per cent of the people that live in them want all possible conveniences.

Why then, in the face of this, is the average percentage of expenditure for electrical work so low?

Why are electrical contractors although they may be as busy as bees, making no more, often, than a living wage?

There is no one reason—but there is one big reason. That is, house builders are not being sold on electrical work. The average contractor gets only the business he is exposed to. If a man runs along with his mouth open he will catch a few flies, but if he uses his brains and a swatter, he will get bagsfull.

The following article has been lifted bodily from the notebook of a wiring salesman. It tells of actual experiences—the real-life efforts of an earnest salesman, who is thoroughly sold himself on better wiring. There is something to be learned from it—read, and inwardly digest!

Remember, these notes are, absolutely, written from actual experience.

No. 1. Was Very Abrupt

No. 1. Very abrupt—I visited the owner of a $30,000 duplex house under construction with a view to selling him electrical appliances, more particularly ranges. He told me that as there was gas on the street, he was not in the market to buy. I then asked him what disposition he hoped to make of this house when completed, and he told me that he expected to live in the lower apartment and rent the upper for the modest rental of $150 per month. I then suggested to him the possibility of his prospective tenant wishing to cook electrically, and asked him how he would meet such a situation, and he replied, that of course he would have to give them service to do so. I then pointed out to him that it would be a great deal more economical to have this service installed when the house was being wired in the first instance. I interested him still further by telling him of the many advantages and comforts to be derived from electric cooking, and he finally consented to ask his wiring contractor what this extra service as outlined above, would cost. He evidently made the enquiry, and found that he was going to be well repaid on his investment, for he had a three 00 wire service installed and afterwards purchased two electrical ranges and two water heaters.

Contract Already Let

No. 2.—A private residence, costing $30,000, under erection. Walls up when I visited the house, gas on the street. I called the owner of this house on the telephone and asked him if he would be interested in getting prices on electrical equipment for his new home, to which he replied that he had not though of doing so. I asked him if his wiring contract had been let and he said, yes; and I further found out that there was no provision being made for the use of heavier appliances. The next day I got in touch with him personally, and pointed out to him that even if he were going to use gas at the moment, he would be well advised and save money to have a heavy service installed. The final result was that in a few days he called me up and told me he had decided to install an electric stove, water heater and grate. Together we visited the house, went through it and decided on several convenience outlets, which would not have been put in had the original wiring plans been followed out. I was in this house a short time ago, and it afforded me great personal satisfaction to think that my feeble efforts had been rewarded in such a very gratifying way. I did not even inquire for the name of the man who did the wiring in this house; but the thought will naturally come home to you, that if this wiring contractor had gone about the matter properly in the first instance, all this reconsideration and re-adjustment would have been quite unnecessary.

The Real Estate Man

No. 3.—Real estate firm building houses in various parts of the city, replied to my inquiries re the wiring in their houses under construction, that in their better houses, selling for $10,000 and upwards, they were installing power service, but in the cheaper houses they did not feel that they were repaid for the extra money expended in installing such power service. They pointed out to me that the buyers of houses worth $10,000 or more are more discriminating and better informed, and therefore, insist on having the most modern facilities for the operations and use of electrical appliances in these homes; whereas the buyers of the cheaper houses are not so particular, and will not pay any more for a house that is modernly wired than for one wired for an ordinary lighting service only. Further, to this I added every argument and reason I know of to convince them, that they would possibly be censured later on by the buyers of these homes for not having had them properly wired, but they simply said that "they should worry," as long as they got them off their hands at the price they hoped to get for them. In houses of this class they were following the lines of least resistance; or in other words, giving their clients less than was really necessary in electric wiring.

A Conservative Type

No. 4.—A private residence for $30,000. I approached the owner of this house as soon as I found out it was well under way, and would be almost ready for wiring. I found him to be an old conservative type of man, and not very kindly disposed to innovations of any kind. I, however, interested him considerably by telling him what wonderful satisfaction hundreds of people in Toronto are enjoying through doing their cooking and water heating electrically; and it finally came to a matter of cost of installation, which I advised him to take up with the man who is going to do his wiring. He finally did as I suggested and I am very glad to relate that very largely due to the cooperation I received from the wiring contractor, this house, although not occupied yet, is equipped with three No. 0 wires in the standpipe, 100 amp. main switch, and convenience outlets well distributed throughout the house.

Didn't Know Anything About It

No. 5.—A prominent real estate agent and building operator has under construction at the present time some thirty or thirty-five houses. When I first approached this man, he told me that he had already decided to install gas, for the one and only reason, namely, it was cheaper than electricity. Like hundreds of others I gathered from his remarks that he hadn't the slightest idea about the costs of cooking or heating water electrically. He had not even gone so far in asking for his wiring tenders as to see that they would include service for anything heavier than ordinary light; but after pointing out to him that his houses, if properly wired, would be more desirable in the eyes of people who have been giving these matters some thought, that in selling them he can point to them with a good deal of pride and say that for the price, they were the most modern block of houses in the city, he re-considered his original decision and now all of his houses are being equipped with three No. 4 wire services. And I might just here mention that he has introduced a novel idea in Toronto, and that is, the one of installing the stove and selling the house already equipped for cooking.

He Cabled For Wiring

No. 6.—Builder and contractor, building an apartment house, nineteen suites. This man at first would not consider wiring an apartment house for electrical cooking, but after drawing his attention to the fact that apartments fitted with electrical cooking equipment would not require the constant redecoration and paintings from year to year that they would require if gas were being used, together with the fact that they would be thoroughly modern, more sanitary to live in—because electrical cooking does not absorb the oxygen in any way, and of course everyone knows that in the case of the gas stove, it takes oxygen to feed the flame. Another argument that possibly gained favor with him was that the kitchens of these apartments would be comparatively as cool in the summer as at any other time of the year on account of the fact that electric stove ovens are thoroughly insulated, and therefore, do not radiate much heat into the room in which they are being used. The result of this effort, I am glad to say, was, that he called for new wiring tenders on the building and is equipping this splendid apartment house throughout with electrical cooking stoves.

So in view of the above experiences, it would seem to me that if electrical wiring contractors were thoroughly sold on real good wiring themselves, and could point out the advantages of such to the speculative builder, the prospective purchaser or tenant, or to the man who is building a home for himself, very few houses that are under construction at the present time would be completed without at least three No. 4 wires in the standpipe. Unfortunately, the tendency seems to be to give a man a cheap installation. Anything cheap, if unsatisfactory, is expensive; so, the better installation a man can be induced to put in his home, the better satisfied he will be for the rest of his life.

"The Very Thing For My Wife!"

ELECTRIC WASHERS FOR XMAS ON THE INSTALMENT PLAN
J. JONES ELECTRICAL DEALER

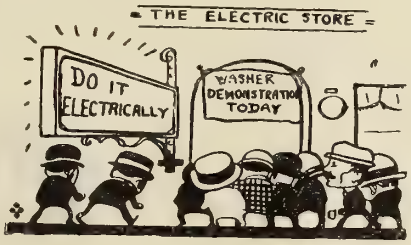
John Dealer Tells How He Sells Electrical Appliances—Especially Washing Machines. "Nails" the Hardware Man, Got His "Goat"—Then He Wakened up.

A representative of the "Electrical News" interviewed a successful electrical dealer the other day to find out from him why he was so successful in selling electric washers.

The retailer's name would be recognized by many if we printed it here, but he is a modest man (notwithstanding his merchandising ability) and he said plainly that he would not give out any ideas for publication under his own name. So we conciliated him by promising to keep it dark and for the purpose of this article we will call him John Dealer.

You Can't Mistake This Store

John Dealer's store is located in one of the business streets that develop in suburban areas, in a medium sized Canadian city. "Electrical News" located the street easily enough and didn't have to search for the number at all. John Dealer had a sign out that no one could mistake, and besides that, there was an electric heater on a stand in the door-way sending forth its rays of welcome into the chill November air, No-one could pass by without recognizing that store as one where electrical appliances were sold.



There was a brisk air about the whole place. The "Electrical News" man was picked up right away, as he paused in the front part of the store, by a cheerful looking clerk who wished him "Good day" in a way that implied he was there to attend to the customer's wants with all the goodwill in the world. He said that the "boss" was in the back store and the writer travelled back past an array of washers, ironers and other appliances, to be greeted with a hearty handshake from John Dealer himself.

Goid Morning, Mr. Dealer! How About Electric Washers.

"Good morning. Mr. Dealer. I phoned you yesterday about your washing machine campaign. Have you got time to give me a few particulars now?

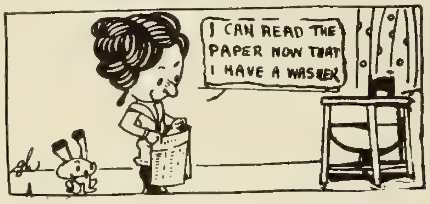
"You're bright and early all right" replied John Dealer. "No trouble to give you all the details you want. Sit down, and tell me what you want to know first?"

"Suppose you tell me why you started the campaign and then how you opened it and the details of its progress."

"Well, in the first place you remember how I used to keep a washer in the corner there. I sold a few, mainly to customers with whom I had a good connection in other ways. There wasn't much money tied up in that end of the business and to tell you the truth I was pretty well satisfied with things as they were. But then Nails, the hardware man down the street, started something. Somebody unloaded a bunch of electric washers on him and he started in to push them. It got my goat to walk past his place and see the signs up,—ELECTRIC washers and ELECTRIC irons, ELECTRIC everything everywhere you looked. And besides, Nails doesn't know the first thing about electricity. I know for a fact that he sold one of those washers and something went wrong with it. Generally he doesn't service machines but this time it was Mrs. Rocks, so he sent up his delivery man to fix it. He fixed it all right. The washerwoman stuck her hands in the water and then threw a fit because this delivery man had grounded the motor feed on the frame somehow and she got a nasty jolt.

They Talked About Electric Washers at the Tea Meeting

"But I'm getting off the track. As I was saying, Nails pushed these washers and I didn't like it, of course. Then my wife said something about how she was out at some tea meeting or other and a woman there got talking about electric washers and said how Mr. Nails had sold her such a nice machine. That woke me up, alright. I saw right then that he was getting a lot of free advertising and that besides washers he would be cutting right into the rest of my appliance business.


I CAN READ THE PAPER NOW THAT I HAVE A WASHER

"What did I do? Well, I thought over it for a while, then I wrote to the manufacturers and said that I would like their assistance in pushing washers. A letter came back by the next mail, and they assured me of their co-operation.

The Power of Contact

"No use troubling you with the details of my arrangement with them. As you can see we got in a live window demonstration. You can't beat a moving display. Look at it now. Did you ever see the old lady working?" and he touched a switch and the automatic window display began to work. It represented the old way and the new way of washing and it was amazing to see the number of passers-by who stopped to take in the lesson of the unkempt figure at the old style washboard contracted with the dainty lady of the house and her shining electric washer.

"That is only part of it, though" said John Dealer. "I spent a little money on advertising too, but the main point was my prospect list. The manufacturers of this machine put me up to that and I got after it in dead earnest. I got every available name.

"Of course I couldn't spare time to do all the canvassing myself. And I must admit I don't care an awful lot for this house-to-house business. What I did do was to advertise for honest-to-goodness canvessers, promising them fairly liberal terms. When they came in I sized them up pretty carefully, I can tell you. I am getting off my story again, but I can tell you to get a good house-to-house canvasser is a pretty stiff proposition. The peddler type is the easiest kind to get, and of course they do you more damage than they are worth. The trouble seems to be that good men have steady jobs—I believe I interviewed a couple of dozen before I got three I thought looked dependable. They have to do a lot of unpleasant work, I believe some of the best of them have to stick their foot in the door occasionally until they gain an audience.

Canvassers Working on Fair Commission

"Well, I got three canvassers; they all had had some experience and the company furnished one of their salesmen to give them a little preliminary drill. So far the campaign had not cost me much, and I made up my mind it had to pay its own way. All the help furnished by the company came gratis, fortunately. The canvassers were to work on commission, and I made that liberal enough.

"By this time I had got so enthusiastic I had forgotten about Nails and the number of machines he was selling. And to tell you the truth, I find the more you work the less you worry about competition.

"There was one more detail that I arranged before the campaign started. I couldn't afford to tie up any more money in stock and it seemed as clear as daylight that if I got a large number of machines off my hands I would be loaded up with paper from the installment plan. It looked like letting easy money go, but I cleared decks right away by arranging for someone else to carry this paper. And in my opinion that's the only way for the small dealer to take care of the installment plan proposition. He can't afford to tie up thousands of dollars in machines not paid for. The charges made by these companies that carry the paper are not unreasonable, either."

"I Felt Encouraged to Run More Advertising"

"Well, with that detail settled, the stage was set, so to speak, and I will tell you what happened. The first thing was that results did not come in right away. It took 3 days for the faithful canvassers to sell a machine. I lay that to sort of getting the bearings loosened up. But, after that, results began to come in and I felt encouraged to run a little more advertising. I got a quarter page and ran it steady, using the washer company's cuts and their copy, pretty much.

MAKE IT AN ELECTRICAL XMAS AND BUY ELECTRIC GOODS HERE

"I guess that's when you began to take notice, wasn't it? Those ads. drew a lot of attention, I know, and the result was all the other birds began to push washers. Now you will think it funny, but that has actually helped business. With everybody boosting electric washing machines and showing how foolish it is to stick to the old rub-board, the public gets talking about it, and they begin to understand that it is the only way to wash clothes. I tell you the only reason people don't come in and buy electric washing machines as a matter of course, is because they are not educated up to using them. Once get them talking about them and they begin to see their value.

Bath Tubs and Electric Washers

"It is like bath-tubs, you know. Remember when a hotel room with private bath was an unheard-of luxury—that was only around 1880. Now you think yourself hard used if you can't get one. It will be the same way with electric washers. I am firmly convinced that in a few years an electric washing machine will be considered a necessity in every home.

" I have found out a whole lot of other things about the washing machine business since I started this campaign. One that sticks in my mind bears out the truth of the old saying "Vanity, thy name is woman." Do you know that once a woman gets a machine, her neighbors are the best possible prospects? It is the old case of keeping up with the Jones's. If Mrs. Jones has a machine and gets satisfaction from it, she naturally talks about it. I don't say that it is done in every case with the desire of exciting the envy of her neighbors—they often do it unconsciously—but it produces the same effect. Yes, sir, if Mrs. Jones has an electric machine, and you live on the same street you are out of it, if you haven't got one too.

ALL THIS FREE SOAP WITH EVERY WASHE

Worse Than Pulling Teeth to Get Machine Back

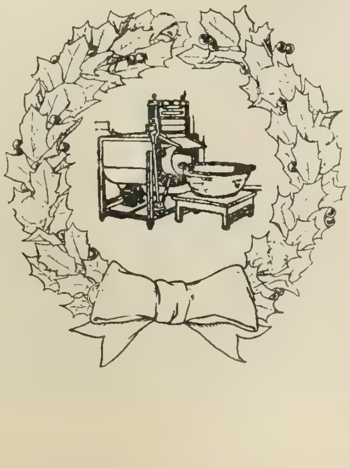
"Another point is, that once you get a machine into a house, it is like pulling teeth for them to let it go back again. The machine is there doing the work and naturally the woman doesn't want to go back to the misery of the wash-tub. Besides that, it takes two men and a truck to move a washer and involves a lot of publicity. Everybody on the street knows that Mrs. Jones is having her washer taken out, and the natural assumption is that they can't pay for it. So 9 times out of 10 if you get a washer into a house, it is sold. The trick is to get them to take the washers into their houses. That is only done by honest salesmen who really believe in electric washing machines themselves.

High-power Salesmanship a Mistake

"That reminds me of another point. In my opinion this high flown type of salesmanship is all wrong when applied to selling electric washing machines to a woman. Theoretically the super-salesman comes along and hypnotizes his prospect into signing on the dotted line at the psychological moment, and everybody is happy ever after. Actually, you can make sales that way, but they don't stick. I have found that ordinary common-sense plus courtesy form the most effective combination for making washing machine sales, and gets you satisfied customers who don't hound you to take the machine back. None of this tricky stuff for me.

"I am satisfied with the results I have got out of the extra effort put into this sale. I admit I was a bit dubious at first, but now you can see for yourself how well it has caught on. I am going to do the same thing every year, too. Now, you can go ahead and make an article out of it for the benefit of others. There is one more thing—tell them to stick to one type of machine. Too many irons in the fire put the fire out. If I was bothered with too many lines I couldn't do all of them justice.

"Goodbye, send me an extra copy with the article in it."



Electrical Enterprise in Old Quebec

Public Interest Receives Real Impulse From a Two Weeks' Demonstration of Westinghouse Cooking Appliances and a Highly Successful Electrical Luncheon Attended by a Record Gathering of Rotarians—Mechanics Supply Company's Commendable Enterprise—Practical Addresses and Interesting Reminiscences.

The merchandising of electrical cooking appliances received a timely and gratifying impetus in Quebec City during the last two weeks of October, when daily demonstrations were given at the commodious headquarters of the Mechanics Supply Company, Limited the local distributors for the Westinghouse firm.

This was the first exhibition of the kind ever given in the old Capital, and the novel and practical operations were productive of ample evidence of a lively interest on the part of the public. The demonstrations were in the competent hands of Mrs. M. J. Sheppard and Miss M. E. Henderson, the former in charge of sales, and the latter as demonstrater

The culminating point of the demonstration was reached on Wednesday, October 25th, the occasion being an electrical luncheon tendered to the Quebec Rotary Club by the Mechanics Supply Company, Limited. This function was unique in the annals of the Club in that its meetings are held regularly at the Chateau Frontenac, and that a record attendance was made on the occasion of this departure from that practice, no less than seventy-eight per cent of the membership being present.

Such is the magnetism exerted by an electrical luncheon —even in old Quebec!

The luncheon was given in one of the company's large show rooms, and the food was prepared on Westinghouse electric ranges within view of the guests.

Nearly one hundred local business men, the majority of them drawn from various circles of important industrial enterprise, sat down to an excellent meal.

The original Office and Showrooms of the Mechanics Supply Company, Limited, on St Peter Street, Quebec. These premises were opened in 1889 and the photograph was taken two years later. The president and vice-president of the firm to-day are shown in the picture—both in the front row, on the right of the doorway, the president, Mr. W. H. Wiggs, and on the left, the vice-president and general manager, Mr. G. H. Simpson. In the rear on the right we have Mr. Omer Carrier, still in the firm's employ as head storeman.

The menu card itself was an example of ingenuity. The frontispiece showed the following alluring picture calculated to advance the interests of the dealer in electrical cooking equipment.

The inside of the menu card contained, in the following lines, indisputable evidence of the versatility of the electrical mind. They were penned by Geo. A. Clare, of the Mechanics Supply Company:

"A Rotarian gay, was worried one day
As he looked at his wife in a dazed sort of way;
The careworn expression he'd longed to efface,
Had vanished by magic, and left not a trace.
So bright and so sweet! Why he jumped with 'de-light'
Yet somehow or other he could'nt guess right
There's a reason of course for the wonderful change
She's lately been using a Westinghouse Range."

The menu itself, which set forth the items of an excellent repast, seemed to lend additional motive to the Rotarian songs which followed. Here it is:

Vacuum Fillers

Entrance Switch
Celery and Olives

Condulet Soup
Boiled in 8½ Minutes

Cut-Outs-Cold
Ham and Beef

Multiple Battery
Salad

Relay
Apple Pie and Cheese

Perculator Connection
Coffee

The "King" having been duly honored, the chairman, Mr. W. MacMillan, paid a tribute to the hospitality of Mr. W. H. Wiggs, president of the Mechanics Supply Company, Limited, who received a warm ovation upon rising to reply.

Mr. Wiggs confined his remarks mainly to an appreciation of the Rotary Club's very practical efforts in creating and developing a civic spirit in Old Quebec. He also rendered tribute to the electrical industry by a tactful reference to the means by which the luncheon had been prepared.

Mr. G. H. Simpson, vice-president and general manager of the Mechanics Supply Company, speaking in French, thanked the Rotary Club for the compliment they had paid their hosts in turning out almost to a man to keep abreast of the spirit of electrical enterprise.

The History, Development and Progress of Electrical Cooking Equipment

A particularly interesting address was given by Rotarian Ralph B. McDunnough, general superintendent of the Public Service Corporation of Quebec, who dealt with the history, development, and progress, as well as with the economical and general advantages of electrical equipment, laying particular stress upon the subject of increased cooking efficiency.

Headquarters Mechanics Supply Co. Ltd., Quebec City

Headquarters of the Mechanics Supply Company, Quebec City—The Ceremony of laying the Corner-Stone of the present building in 1913

Mr. McDunnough said in part: "It is rather apropos that I should be the speaker at this electrically-cooked luncheon, as I am one of the pioneers in electrical cooking in the Province of Quebec.

"I have been married some fifteen years and have never used anything but electricity for cooking. In those early days of the art, we did not have a complete range such as is available today. We had separate appliances for each purpose,—all assembled in a cabinet for convenience. I still

Electrical Display Room, Mechanics Supply Co. Ltd., Quebec have some of the original articles at home. Now I have a complete range.

"The first practical attempts at electrical cooking go back to 1890 in England. In 1891, there was an exhibit of electrical cooking appliances at the Crystal Palace. In 1895 an electrically-cooked banquet was served at the Cannon Street Hotel in London. The Lord Mayor was present at the function. This banquet was a great success—not only in regard to the cooking, but also in arousing public interest in the subjcet.

"The idea was first taken up in the United States about 1900, but little progress was made until 1905, when three manufacturers started making cooking appliances. From then on the progress was rapid, and in 1909 the electrical range came out practically in the form of today, although in cruder design and lacking in many improvements now available.

Photo of the demonstrations carried out in their showrooms, during October, by the Mechanics Supply Co.

"It is safe to say that no progress would have been made had it not been for the development of nichrome wire. Nichrome wire has about sixty times the resistance of copper, while German silver has twenty times, and good steel wire eight times that resistance. Nichrome wire does not oxidize or deteriorate under ordinary temperatures, and has a melting point of 2,500 F.

"Fuel heat is produced by a gaseous, vitiating soot-producing flame, which is the result of combustion with the oxygen of the atmosphere. Electric heat is produced by a current flowing through a wire of high resistance, which does not affect, nor is it affected by, the atmosphere. Electric heat is different from fuel heat, as it may be concentrated at the point of application in any quantity and with a uniform intensity. It is produced without combustion, flame, soot or fumes, may be confined to any area, and is under absolute control.

"Heat is imparted in three ways familiar to us all—radiation, conduction and convection. The burners of an electric range impart their heat by a combination of conduction and radiation.

"Heat is measured in British thermal units. A B.t.u. is the amount of heat required to raise one lb. of water one degree Fahrenheit. If you consider a dollar's worth of electricity as compared with coal, oil, gas or wood, you will have less B.t.u's. for your money,—but, owing to the efficiency with which these B.t.u.'s may be applied in cooking, you have more cooking value for your money than with the other fuels. It is a proven fact that a piece of meat roasted in an electric oven will lose less weight than if roasted in a coal oven or gas oven.

"Ranges are designed today to store heat, and the careful housewife saves much by knowing how to utilize this stored heat to the best advantage."

The speaker discussed the trend of design in ranges and appliances, and also spoke of other applications, such as electric bake ovens for bakers, and the heating and baking ovens used today in factories for various purposes.

Mr. A. L. Smith, of the Canadian Westinghouse Company, addressed the Luncheon briefly, and invited the members to take advantage of the consultant facilities afforded by the Illumination Department of his firm. Mr. George Wendt was also present representing the Westinghouse interests.

An entirely enjoyable luncheon, in which there was not a single dull moment, concluded with the singing of the National Anthem.

An Attractive and Impressive Demonstration

The electrical equipment on view in both the demonstration and display rooms of the Mechanics Supply Company evoked much interest and reflected great credit upon Mr. G. Lorne Wiggs, B.Sc., one of the members of the firm largely responsible for the details. An attraction of interest was an electrically-operated lantern slide machine known as a stereomotorgraph, manufactured by the Chas. Beseler Company, New York, N. Y.

Mr. Wiggs a Big Factor in Electrical Development

In conversation with "The Electrical News", Mr. Wiggs, the genial President of the Mechanics Supply Company, drew upon a fund of interesting reminiscence. Mr. Wiggs is well-known as one of the pioneers of electrical development in a romantic and historical city whose outward aspects still take us back to the time when the very elements of electrical science were unknown. Speaking of his early days, Mr. Wiggs recalled how as a boy he made experiments in the kitchen at home with sulphuric acid, copper and zinc plates, in an effort to produce electricity; and how later on when called upon to do so, in the addition of an electrical line to his business, he was able to go out after the store had closed and instruct some of the mechanics to install electric bells and electric lights. This was when the electric art was in its infancy and when few of the local tradesmen knew how to wire a residence. At that time he bought fuse wire by the yard,—now he buys it by the ton; then he purchased half a dozen cells (the dry battery not being known),—now he buys by the carload.

It was in 1899 that Mr. Wiggs, then a young man of twenty-seven, laid the foundation of his present business, whose ramifications today extend from Europe to Japan.

The company now employs a staff of seventy-five, many of whom have been identified with the firm upwards of twenty years. The Sales Department, for instance, is in charge of Mr. Walter R. Wilkinson, secretary of the company, who has been with the firm for more than a quarter of a century, both he and the vice-president, Mr. G. H. Simpson, having left school to enter Mr. Wiggs' employ. Other "old-timers" in this class are Mr. John Benson, Mr. J. E. Theberge, Mr. Claude McWilliam, Mr. Louis Ruel, Mr. Art. Matte and Mr. A. Morrisset, the two last-named now being directors of the company.

The Mechanics Supply Company's business is not confined to the electrical trade. They carry a full line of plumbing, heating, and engineering supplies, as well as automobile accessories,—each a business in itself.

From the standpoint of the electrical man, their headquarters on St. Paul. Street, Quebec, are well worth visiting. The show rooms are a particularly interesting feature, housing varied and artistic lighting fixtures, household appliances, Westinghouse ranges, "Thor" washing machines, vacuum cleaners, and portable sewing machines.

Recently the firm added a complete line of radio apparatus. This department is under the direct supervision of Mr. G. Lorne Wiggs, B.Sc.

An extensive branch of the company's trade is the equipment of small towns and municipalities with independent telephone systems.

Mr. Wiggs is a rare example of presidential efficiency. The head of the largest business of its kind in the province, not only does he direct the general policy of his firm, but he keeps his finger upon all the administrative details. He it is who sees that the company's products are kept before the public—kept before his own particular Province of Quebec public in the two languages in which that public speaks. he is was who personally devised the elaborate and efficient system of record and book-keeping now in force—a system which is the outcome of years of painstaking study. He it was who devised the follow-up record in this system—with its predetermined totals of all the cash and credit systems—and who actually devised special machines for the practical operation of his ideas.

* * *

The special demonstrations at the headquarters of The Mechanics Supply Company, combined with the warmth of the hospitality shown at the Electrical Luncheon, cannot fail to have served to promote public interest in electrical progress in a section of the country where just such a touch of enterprise was most needed. For ourselves, the reminiscences of our genial host, Mr. W. H. Wiggs, have provided at least one member of the staff of "The Electrical News" with a particularly enjoyable recollection of Old Quebec—and the desire to return.

Has Cooked Electricall for 15 Years

Mr. Ralph B. McDunnough, general superintendent of the Public Service Corporation of Quebec, a report of whose interesting address at the electrical luncheon in Quebec City tendered to the Rotary Club is published in this issue, is a native of Montreal and an electrical engineering graduate of McGill University ('95). He has had extended experience at the Schenectady Works of the General Electric Company and with various operating companies in the States. For the past eighteen years he has been identified with the Shawinigan companies.

R. B. McDunnough

The financial statement of the Quebec Railway, Light, Heat & Power Company for the nine months ended September shows a very substantial increase in gross earnings, and as the operating expenses were below 70 per cent. (as contrasted with 74.56 per cent. for the nine months of 1921), the net surplus was consequently some $163,000 in excess of the surplus of last year. The actual net surplus for the nine months was $235,798, against $72,454 for the same period of 1921. The real significance of the statement for the nine months is to be found in a substantial reduction in operating costs. It is clear that on the strength of the earnings for the period covered, the company will show probably one of the best years in its history.

Efficiency of Peanut Tube as Radio Detector Dependent on Its Power Amplification

No Hump in Characteristic Curve—A Limit to the Efficient Increase of Plate Voltage—Best Results Obtained With Blocking Condenser and Grid Leak

By W. B. CARTMEL, B.S., M.A.*

Now I wish to say something about the amplifying and detecting properties of an audion. These tubes amplify both the voltage and the current. The voltage amplification factor depends on the design of the tube. The standard repeater bulb has an amplification value of 5.5 to 6.5, although there is a type of repeator bulb that amplifies the voltage twenty to thirty times and special bulbs are sometimes used that amplify two hundred times.

Power Amplification of Peanut Tube 187 Times

Our peanut tube amplifies the voltage anywhere from 5.5 to 6.5 times, let us say six times. What is meant by this is that if we put a voltage on the grid, the current in the plate circuit increases by six times as much as if we had added that much voltage in the plate circuit itself. Suppose for instance a battery of 1-1/2 volts be applied to the grid it will boost the plate current as much as six times 1-1/2 or nine volts added to the plate circuit. The current in the plate circuit is also amplified so that the power amplification of the peanut tube is 187, which means that the strength of a signal is amplified 187 times as was previously stated.

Why the Peanut Tube is a Good Detector

I would like to explain very briefly how it is that this tube which is essentially an amplifying tube is such a good detector, because you will realize the great advantage of standardizing on one type of tube provided it is capable of doing both jobs well. Many detector tubes as you know have a little hump in their characteristic curves. With such tubes sharp detection is obtained, but it is necessary to adjust the plate voltage so that the detection takes place on the hump of the curve. Such a hump on the curve renders the tube useless as an amplifier. The peanut tube has no such hump in its characteristic curve, and does not need any, because a different principle is used to accomplish detection. In order to explain this, let us consider a tube in which there is no grid and no plate battery. This you will remember is similar to the so-called Edison effect, already mentioned at the beginning of this paper. Edison placed a plate within the bulb of his incandescent lamp and connecting this plate with the positive end of the filament he was able to obtain several milliamperes of current. This was afterwards found to be due to electrons or particles of negative electricity flowing through the vacuous space of the lamp from the filament to the plate, and it is the control of this stream of negative electricity by means of a grid which gives us the modern vacuum tube. Now you will notice that since the plate is connected direct to the positive end of the filament, that it is at the same voltage as that end of the filament and therefore electrons do not flow from that end of the filament to the plate because, as we know, there must be a voltage between the filament and the plate, that is to say, a "B" battery, in order to get a flow of electricity.

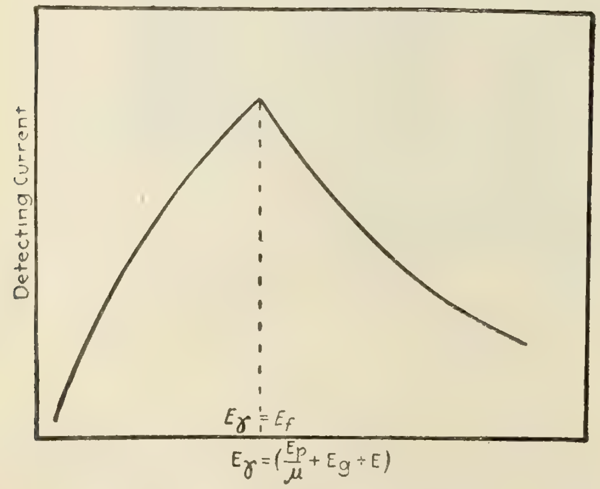


Fig. 1—Theoretical curve giving sharp detection for voltage

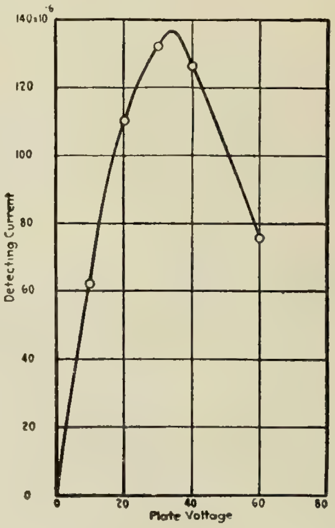


Fig. 2—Actual results from tube similar to peanut tube

Different Pressure Between Negative and Positive Ends

However, Edison probably used one hundred volts to light the filament of his lamp and therefore the voltage between the negative end of the filament and the plate was one hundred volts, which answered very well indeed to drive the current through the plate circuit. I think you will readily see that every point between the negative and the positive end of the filament is acted upon by a different electric pressure forcing electrons, beginning with one hundred volts at the negative end of the filament and diminishing to nothing at the positive end. You will see therefore, that there will be a corresponding flow of electrons. The electrons emitted from the negative end will be drawn along towards the plate very forcibly while the other portions of the filament will have their electrons driven less and less forcibly as we approach the positive end of the filament where the electrons are not driven over at all. Now, if we put an actual "B" battery in between the filament and the plate, the portions of the filament between the negative and the positive ends will be acted on more strongly and as we increase this plate battery, portions nearer the positive end of the filament will contribute more electrons until finally with sufficient voltage, a uniform flow will proceed from all parts of the filament. When this point has been reached, any further increase in plate voltage will only have a general effect in forcing electrons from the whole of the filament over towards the plate. It is at that place where there is a sudden change in the efficiency of the plate battery in driving over electrons that the tube is most efficient as a detector.

Voltage in Plate Circuit

Let us see if we can find out how much voltage must be used in the plate circuit in order to operate on the point in the detecting curve defined above. In detecting, we receive electrical oscillations on the grid and when detecting by this method it is necessary to have the grid at a negative potential, otherwise we do not obtain good results. Let us imagine, therefore, that the grid is attached to the negative end of the filament and we will suppose that we have put in a grid battery of, we will say, 1-1/2 volts in order to maintain the grid sufficiently negative. In addition to this grid battery there is another voltage on the grid to be considered, viz; the contact difference of potential between the grid and the filament. I have not said anything about this so fas, but such a difference of potential exists and this may be either positive or negative and may be as great as two volts. In the peanut tube this voltage is negative and the process of manufacture is kept down to less than one volt.

Additional Voltage Necessary on Plate

In order to make electrons flow all over the heated surface of the filament including the positive end, it is necessary to put additional voltage on the plate to overcome both the negative grid battery voltage and the contact difference of potential. Now, as previously stated, in the peanut tube from five to six volts are necessary in the plate battery to overcome the effect of one volt in the grid battery so that every volt or every fraction of a volt received at the grid times as much voltage applied in the plate circuit. There-produces as much effect in changing the plate current as six fore, if we take the grid battery voltage, say 1-1/2 volts, and add to it the filament voltage which is one volt in the case of the peanut tube, then add to that a voltage of from 1/2 to 1 volt contact difference of potential (we will assume 3/4 of a volt in this case), that will give us 3-1/4 volts, multiplying this by six gives us nineteen and a half volts as the proper voltage to use with this type of tube in order to get the best detection. This voltage varies with different tubes, but will be in the neighborhood of 19-1/2 volts.

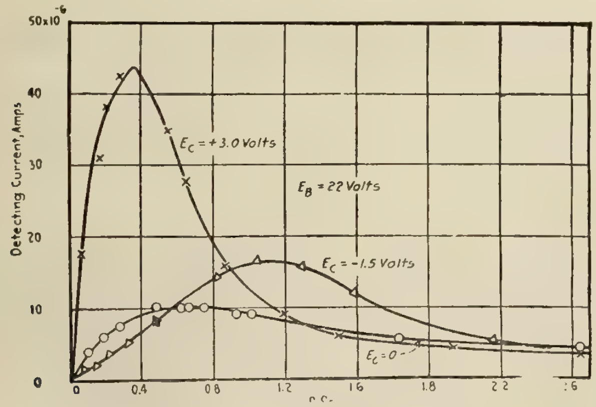


Fig. 3—Detecting current in three cases

Figure 1 shows us a theoretical curve worked out mathematically giving a sharp detection for the voltage as we have computed it, and Figure 2 gives the results of some experiments made on a tube of a type similar to the peanut tube. It will be noted that while the detecting current is a maximum in this tube with about 35 volts on the plate, there is almost as good detection over a range of from 23 to 43 volts. This is similar to the peanut tube which although having a maximum detection voltage, gives good detection over a range of from 17 to 22 volts .

Best Results With Blocking Condenser and Grid Leak

I have merely mentioned this method of detection because some of you may find it necessary in the circuits that you use, to make use of grid voltage detection rather than a blocking condenser in the grid, and I wish to emphasize the fact that this little tube is an excellent detector used in this way, because of its low filament voltage which makes it very sensitive. However, even with the peanut valve the best results are obtained by using a blocking condenser and a grid leak. In this case the best results are obtained with a positive potential on the grid or with the grid connected to the positive end of the filament. This gives much better results than with the grid connected to the negative end of the filament. I have no direct results showing the sensitiveness of this method except for the reception of continuous current telegraph signals by heterodyne.

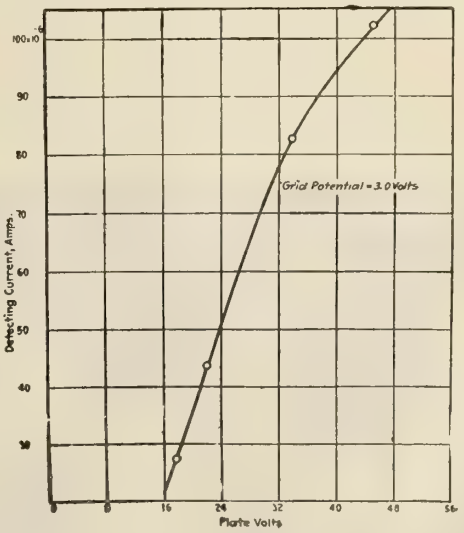


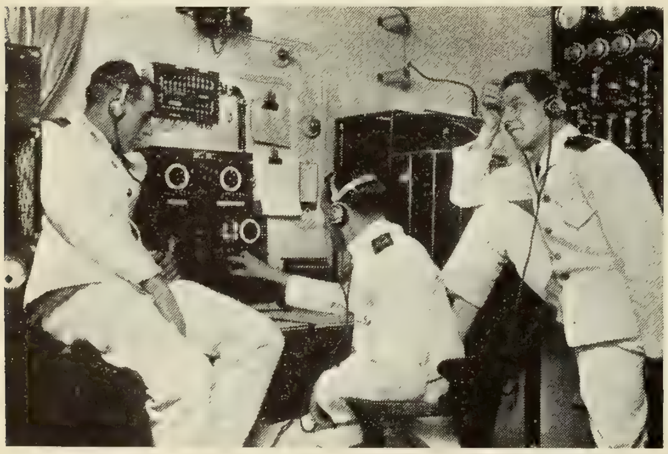
Fig. 4—Results of different voltages on plate in connection with heterodyne reception

Detecting Current in Three Cases

The curve I have here (Figure 3) shows the detecting current in three cases, one with the grid three volts positive, another with no potential on the grid and another with 1-1/2 volts negative on the grid. You will notice that for weak signals very much better results are obtained with the grid three volts positive in which case the detecting current rises to a sharp peak value as the signal strength increases and then rapidly falls off. You will note that with 1-1/2 volts negative on the grid there is also a peak to the detection curve, but that this occurs for a fairly strong incoming signal. With very weak signals no voltage on the grid gives better detection than 1½ volts negative, but that with three volts positive the detecting current is enormously greater for very weak currents than in either of the other two cases. What I wish to emphasize is merely that in using detection without a blocking condenser it is necessary to maintain the grid slightly negative in order to stop any flow of electrons to the grid and that the tube must be operated within a certain range of plate voltage, (seventeen to twenty two volts) unless the grid is made more negative in which case five or six volts must be added in the plate circuit for every extra negative volt on the grid. With blocking condenser detecting, we recommend on the other hand that the grid be connected to the positive end of the filament, and that if any voltage is to be on the grid this should be a positive voltage. In this case the peanut tube is not limited to twenty-two volts on the plate but higher values may be used. This may be seen from Figure 4 which shows the results of different voltages on the plate in connection with heterodyne reception using a blocking condenser on the grid.

Limitations of Peanut Tube

Before concluding about the little peanut tube I wish to speak about its limitations as to volume. All tubes are limited as to the amount of power which they will deliver. This is true of the largest power tube just as it is of the little peanut tube. This tube, however, gives a large output for a tube of its class, being capable of delivering a power output one hundred times as great as the amount delivered in a first class commercial telephone conversation. What is meant here by a first class commercial telephone conversation is the grade of transmission which the telephone companies consider satisfactory, which they try to meet in all cases, and which they usually exceed for local calls and sometimes exceed on long distance calls.



Wireless room and operators on the Canadian Pacific Liner "Empress of Scotland"

Power by Wireless?

Transmission of power from Niagara Falls to New York by radio is a possibility of the future, in the opinion of Dr. E. F. W. Alexanderson, chief engineer of the radio corporation. This prediction followed the success of a sixteen-hour test of electron tubes in place of large alternators, in transmitting wireless messages across the Atlantic ocean.

Reception on Train With Inside Antennae

Radio reception has been successfully accomplished on a fast-moving train using an inside antennae. Completely inclosed in a steel coach of the Broadway Limited over the Pennsylvania road, a concert from a station at Newark, N. J., radiophone messages from points a hundred miles and more distant, and code signals from a distance of several hundred miles were received. The receiving antennae consisted of an 18-inch loop.

Radi Amateurs on Increase in Quebec

Mr. David R. McWilliams, Inspector of Radiotelegraphs for the city and district of Quebec, recently stated that in the city of Quebec there are at the present time from fifty to seventy-five amateur receiving stations and a small number of transmitting stations all of which are of a very high order and with a range up to one thousand miles in some cases.

Radio Sales Prospects

A radio boom is predicted for this winter. The volume of sales in receiving sets and parts from the first of October until the end of 1923 is expected to entirely eclipse the turnover for the preceding six months. The bulk of orders for these sales were taken in April, May and June. Factories have been going at full blast all summer filling these spring orders, as well as the smaller summer demands. An effort is being made to propagate the idea of a "radio Christmas." The slogan will be "Give a radio set" and it is hoped to stimulate a huge volume of business that will last right up to Christmas.

Broadcasting For Fort William

At the organization meeting of the Twin City Radio Association, held recently it was decided to install a broadcasting station. R. P. Coats, organizer of radio clubs throughout the Dominion, stated that the new station would be in operation in about 3 weeks.

It is estimated that there are upwards of twenty radio receiving sets now located in different parts of Fort William and about half that number in Port Arthur. The premier set in Fort William is claimed by the Royal Theatre, which has instruments capable of receiving concerts from as far off as Atlanta, Georgia. J. H. Beamish claims to have the most powerful receiving set in Port Arthur.

Official List of Radio Stations in Canada

The official list of radio stations in Canada, as published by the Department of Marine and Fisheries, has been received. The list is attractively bound in blue and is so arranged that new editions can be filed within the same cover. The book contains a list of national call signals, international list of call signals, coast, land and ship stations in Canada alphabetically by call signal, coast and land stations alphabetically by name, ship stations alphabetically by name, a very complete list of amateur receiving stations and miscellaneneous data. In this connection Mr. Edwards writes as follows:—

Department of Marine and Fisheries,
Ottawa, Oct. 9, 1922.

Editor, Electrical News:

I am enclosing herewith a copy of our first issue of "Official List of Radio Stations of Canada."

The price has been fixed at cost, viz; $1.00 per copy, including supplements.

If the publication of this list is to be an annual affair, it is essential that the present edition should be completely disposed of. A complete up-to-date list of Canadian Radio Stations must be of considerable value to everyone interested in radio.

You will notice that the cover has been made so that it can be used for future yearly editions, and holders would not have to purchase a cover with the next edition.

Yours very truly,
C. P. Edwards,
Director Radio Service.

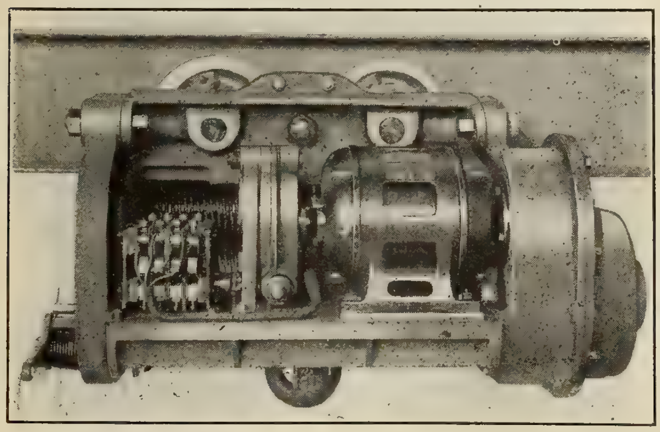
The Latest Developments in Electrical Equipment

Focussing Searchlight

The Diamond Electric Specialties Corporation, 101 South Orange Avenue, Newark, N. J., has recently placed on the market a portable searchlight which focusses a beam of light with a range from one to 100 yards. The lamp of the device which is fed by three dry cells is held in a cushioned holder to prevent breakage, and a shock absorber acts in the same capacity to protect the lens. The light is controlled by a contact switch which locks in the "off" position, and by means of this the light can be flashed intermittently or continuously. A hinged front is provided so that access can be had to the interior parts in addition to making lamp replacement easy. When not in use the handle is folded out of the way.

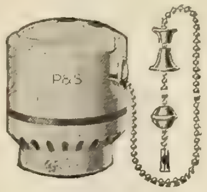
Electric Hoist

An electric hoist embodying several new features, has been placed on the market by the Standard Electric Crane and Hoist Company, 1420 Chestnut Street, Philadelphia, Pa. The main feature of this hoist is the short headroom dimension in which it will operate, the 3-ton hoist requiring only 14 ins. of headroom. It is claimed by the manufacturers that this feature allows materials to be stored and stacked much higher and that, furthermore, it is possible to operate this hoist in headroom spaces where it has been impossible to use one heretofore. The motor is, of course, especially designed for hoist service, being fully enclosed and of sturdy construction. Spur gears are used for the hoisting drive and are contained in the end housing. The main bearings are automatically lubricated by the "Alemite" system. An upper limit device breaks the electrical circuit and applies the holding brake, when the load block has reached its upper limit of travel.



Short Back Receptacle for Ceiling Lights

Pass & Seymour, Inc., Solvay, N. Y., are placing on the market at this time, three practical devices for use with ceiling lights, ceiling bands or any standard or special unit. They fit the standard 1-½ inch throat of the ceiling units and provide individual control. The back of these Receptacles is 1-3/8 inches, and the ring is designed to give room for the glass in the shade holder of the unit. Wiring terminals are enclosed in the porcelain shell. This permits these receptacles to be used where weatherproof devices are required. Each receptacle is furnished with extra bell mouth which may be placed in the ceiling unit so that the chain or cord falls free of the glassware. The bell mouth acts as a guide for the chain where it passes through the shell of the unit or ceiling band.



Handy Portable Crane

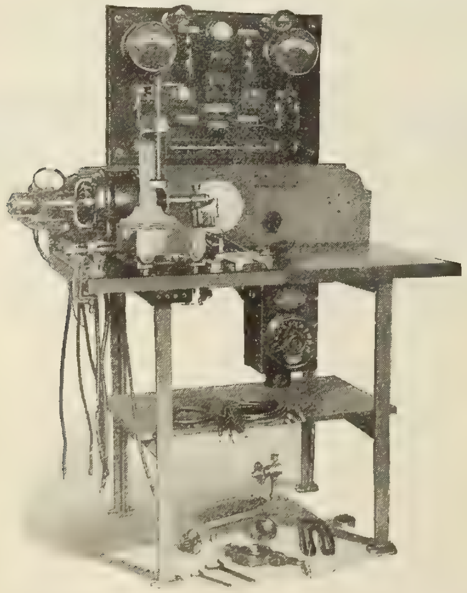
The Elwell-Parker Electric Co., of Cleveland, Ohio, have recently developed a new storage battery operated electric revolving crane truck, wherein the battery serves as counter-balance and its compartment as a support for a double drum hoist unit operated by a single motor. Electric power to this motor is furnished from the same battery furnishing power to the main propelling motor. This motor drives the pair of larger wheels immediately back of the crane. This crane has a capacity of 3,000 pounds at 6-foot radius, or 1,000 pounds at 12-foot radius—truck load capacity 3,000 pounds—speed 5 m.p.h. One charge of battery will operate truck 15 to 20 miles. The attached illustration gives a general idea of the capacity of the crane, since it is here shown lifting a Dodge motor car. This equipment has been in use in locomotive shops for handling air pumps to locomotives, handling railway car wheels and axles, heavy reels of lead covered telephone cable, armored plates in the building of vaults in large banks, heavy loads in and off of street trucks, stacking of materials in warehouses and the loading and unloading of lighters at the water front, also handling motors to and from test blocks and chasses into railroad cars.

New Type Candle Socket

The Canadian General Electric Co. Ltd., are manufacturing a new type of candle socket, shown in the accompanying illustration, that contains new features in labor saving to fixture manufacturers and wiremen. The body of the socket is covered with mist gray paper which does not readily show the dirt. The terminals are exposed in such a manner as to make the wiring easy. The supporting yoke is made of ribbed and embossed steel to give strength and rigidity and has a polished nickel finish to prevent tarnishing and rusting. The yoke is designed in the form of a clamp with two screws which securely grip the candle fixture stem or nipple and obviates the necessity of threading this stem as in the ordinary form of candle socket where a threaded nozzle with set screws is used. This clamping yoke has another valuable feature in that there is from one quarter to three eights of an inch adjustment up and down the stem which allows a wide variation in the cutting of the stems or nipples and allows the socket to be easily adjusted flush with the outside shell of the candle.

Universal Test Bench

An improved universal test bench is being manufactured by Joseph Weidenhoff, 4352-58 W. Roosevelt Road, Chicago, Ill. It is claimed that this test bench places in the hands of the service station operator all the devices necessary for the testing of every make of starter, generator, magneto, induction coil, distributor, condenser, spark plug, moulded insulation, and insulated conductors.



Equipment includes mechanical circuit breakers, torque testing device, speed indicator, condenser testing device, low resistance master vibrator, cutout automatically controlled for 6 to 12 volts, 12 point adjustable spark gap, 3 point adjustable spark gap, test leads, plug sockets for reception of test leads, 110 volt test lamp, and magneto holding bracket with pulleys and belt.

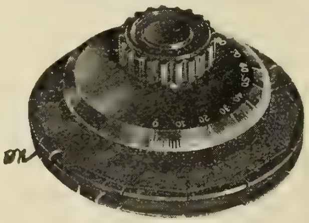
The drive motor provides any set speed from 200 to 3,500 r.p.m. with the speed controlled through a stepdown transformer.

Full Safety Motor Starters

The Nesbitt Electric Manufacturing Co., Ltd., 27 Melinda Street, Toronto, have a valuable little pamphlet describing their Full-Safety Motor Starters. This company is licensed to manufacture Westinghouse Full-Safety Motor Starters. These come in types: WK-10, WK-20, WK-30 and WK-100 with capacities ranging from the smallest motors up to fifteen horsepower, 550 volt. While the mechanism of each type differs, it is explained that the features of safety and reliability are common to all. These are: protection to the operator, protection to the motor, ease of installation and repair, simplicity of design and operation. The booklet describes the different types in detail with ample illustrations.

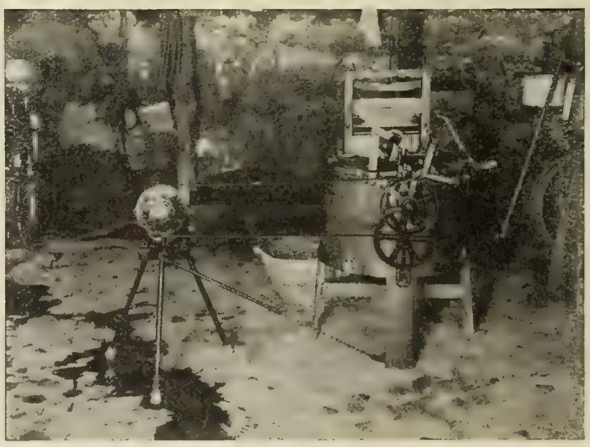
Rogers Receiving "Radiometer"

A tuning device of unusual construction has been placed on the market by Ludwig Hommel & Company, Pittsburgh, Pa. A pair of flat discs are used and the magnetic fields are divided into two separate components. The stationary disc is clamped to a panel bushing.



New Portable Power Stand

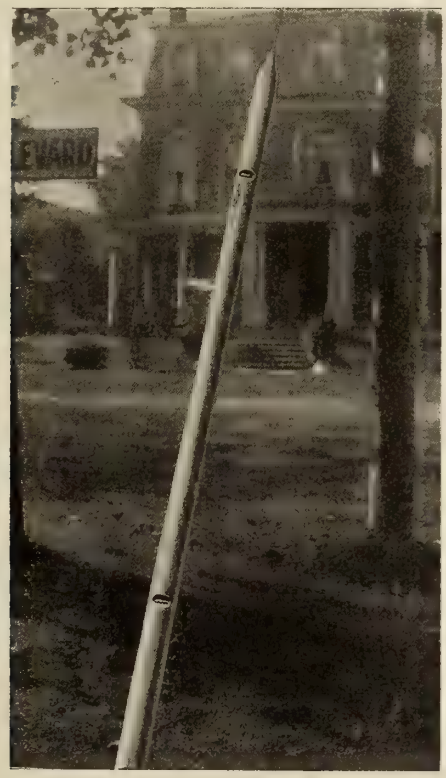
A new portable power stand has been developed by the Westinghouse Electric & Manufacturing Company to supply motive power for the various appliances found in every day use on farms and in stores, garages, and small machine shops. The stand consists of a $\frac{1}{4}$ horse power back-geared motor mounted on a tripod stand. The rotor speed of the motor is 1,750 revolutions per minute and the speed of the back-geared shaft is 210 revolutions per minute. Four power pulleys are supplied, two of which take a one-inch flat belt and the other two a $\frac{3}{8}$ inch round belt. Through this system of back gears and the four pulleys a range of speeds is obtainable



and the motor can be belted to operate at the proper speed any device that can be worked with a ¼ horse power motor. The stand is light, weighing only 55 pounds complete. A wood-grip handle is mounted on the frame for convenience in moving. The stand is stationary when placed at work, for an adjustable, telescopic rod, which may be used either as a brace or as a tension anchoring device, is used to anchor it. Ten feet of extension cord is provided so that the stand can operate at any convenient place, even when located at some distance from the lamp socket.

A Makeshift in the Discard

It is rather unusual that as poleline hardware has been improved in almost every way that the guy wire that stands such a constant strain has been treated with such indifference where protection is involved. Just an old iron pipe or maybe a wooden contraption has been put around the wire and then the wire has been left to rust and bust or run the gauntlet with lady luck. No chance for inspection was possible, and disasters have occurred when the rusted guy wire has suddenly refused to continue to be treated so badly and let down whole strings of poles.



Just lately in one of Canada's largest cities hundreds of supposedly protected guy wires have been replaced—the old iron tubes and boxings being removed and a new specially designed protection put in their places. This patented contrivance consists of a curved galvanized steel sheet running up the guy wire and clamped to the wire by a couple of U-bolts. This protects and allows inspection and because it is open to the air on the underside, no rust can work without detection. This new device is a product of the N. Slater Company.

Brantford Oven & Rack Co. Adding Electric Bake Ovens

Electric bake ovens have been recently added to their line by the Brantford Oven & Rack Company, Limited, Brantford, Ont. These are made in connection with the Canadian Westinghouse Company, Westinghouse space heaters being used as heating elements. The new product is described in an interesting bulletin which is sent on request.

Connecticut Tel. & Electric Co.

In order to give their Canadian trade better attention and service, the Connecticut Tel. & Electric Co., Meriden, Conn. U. S. A. have appointed district sales representatives in Vancouver, Winnipeg, Toronto and Montreal, as follows:—Cochrane, Stephenson & Co. Ltd., 265 Portage Ave., Winnipeg; Cochrane, Stephenson & Co., 608 Pacific Bldg., Vancouver; Pierce Electric Co., 39 Richmond St. E., Toronto, Ont.; Timberlake & Bourne, New Birks Bldg., Montreal. This company has been manufacturing telephones and high class electrical and signal apparatus for over 28 years, and has a factory employing over 1,000 skilled electrical workers.

Besides the well-known Connecticut telephones, for interior use, this company also manufactures, Connecticut ignition for automobiles as well as the Connecticut radio apparatus. The interior telephone line consists of special systems for apartment houses, public buildings, schools, offices, manufacturing plants, etc. This company has also just placed upon the market a new hospital silent signal system which is entirely new, they also manufacture the well-known line of Connecticut annunciators, and push button specialists, and can furnish telephones for mine and street railway use, as well as for rural telephone exchanges.

Three Eureka Stores

The Eureka Vacuum Cleaner Company have opened up a new retail store at 218 Craig Street West, Montreal. This store is under the management of L. E. Seguin who was formerly with L. C. Barbeau and Company. This makes the third store of this company in Canada, namely, 218 Craig Street West, Montreal, L. E. Seguin, manager; 377 Yonge Street, Toronto, H. L. Tucker, manager; and at 610 Portage Avenue, Winnipeg, V. R. Homersham, manager.

Ace Manufacturing Co.

Guy S. Clarkson has just opened offices under the name of the Ace Manufacturing Co., at 304 Great West Permanent Building, Winnipeg. The firm manufactures an electric dishwasher, to be known as the Ace electric dish washer. This machine is 40 inches high, and 21 inches in diameter; it is finished in white enamel, with three narrow blue bands, and has two removable and interchangeable wire racks, capable of holding 42 pieces of china. This washer is on ball bearing casters, and has 1/6 h.p. Westinghouse motor; it is very simple to operate, only one gallon of water being necessary for a full wash, which can be done in a matter of a few moments. It is being manufactured to retail at a very conservative price and the firm report a large number of enquiries.

Mr. I. D. Livinson, eastern representative for Cid Fire Alarm Company, Reg'd., and E. H. Freeman Electric Co., Trenton N. J., has moved from 121 Bleury St., Montreal, to 2664 Park Avenue.

Current News and Notes

Abbotsford, B. C.

At a recent meeting of ratepayers it was resolved that a petition should immediately be circulated among owners of property in the townsite to find out if a majority of the owners were in favor of lighting the town under the provisions of the "Rural Lighting Act." Messrs. Hill, Shortreed and Webster were appointed a committee to draw up a tentative scheme for a 10 to 20 light system.

Charlottetown, P. E. I.

Mr. W. S. Grant, general manager of the Prince Edward Island Telephone Co., recently stated that the cost of the new long distance telephone being installed will run close to $100,000.

Chatham, Ont.

It is reported that a transmission line will shortly be built to the villages of Merlin and Fletcher.

Edmonton, Alta.

Federal plans for a chain of wireless stations extending right into the Arctic circle are being completed. The stations will be operated by the Dominion government with the primary purpose of keeping federal officials in touch with one another. The locations for the proposed stations are Fort Smith, Resolution, Simpson, Norman and McPherson on the Mackenzie, and the sixth at Dawson City.

Guelph, Ont.

Increased fares on the Guelph Street Railway went into effect recently. The new rules call for a six-cent cash fare; six tickets for 35 cents and twenty tickets for $1. Children will continue to be carried for three cents.

On Nov. 9, a sitting of the Hydro-electric investigating commission was held in Guelph. Its members heard a lengthy debate on "Hydro and its relations to Guelph." Added interest was given to the discussion because the Hydro Commission has been operating the local street car system for the last 18 months and expenditures for rehabilitation came up for discussion. Speakers were Ex-Mayor J. E. Carter, J. M. Taylor, head of the Taylor-Forbes Co.; Ald. Oakes and Joseph Tovell, G. J. Thorp, J. W. Lyon, Ex-Mayor Sam Carter, J. I. McIntosh, H. Gummer and J. J. Heeg, Chief Engineer Gaby, of the Hydro Commission, and H. E. Guilfoyle, the Hydro Commission's auditor, also gave evidence.

Hamilton, Ont.

The City Council has unanimously approved of the introduction of a by-law, so that the ratepayers may vote January 1 on the proposed Hydro-radial line from Port Credit to St. Catharines.

On Nov. 7 Barton Council refused to rescind the by-law passed at the last meeting, which authorized the formation of a Hydro-electric Commission for the municipality, with members of the Council, to carry on the commissioners' work until the next municipal elections are held. A deputation of ratepayers of the township was present, and urged that the by-law be rescinded.

Kirkland Lake, Ont.

The mines of the Kirkland Lake gold area received a full supply of hydro-electric power by the 1st of November. The Northern Ontario Light and Power Company carried out repair work in record time, the time occupied in reconstruction having been approximately four weeks. Considering the extent of the fire damage, including poles and wires for an aggregate of about 12 miles, the quick work of the power company is an outstanding achievement. As a result, the November production of gold from Kirkland Lake is expected to reach normal rate at least, and with indications of a substantially steady increase in output from month to month.

Kitchener, Ont.

Dr. J. E. Hett is building three houses, one on Park street and two on Peter street, equipped with radio receiving apparatus. He is a radio enthusiast and was one of the first to have a receiving set in this city.

London, Ont.

The trackless trolley buses, as designed by the Hydro-Electric Power Commission and operated at the Border Cities, are more economical as a means of civic transportation than the gasoline bus, is the gist of a detailed comparative statement, prepared by Sir Adam Beck, chairman of the commission, and submitted to Acting Mayor H. J. Childs, chairman of the finance committee of London city council.

According to the report prepared by Engineer Bunnell of Toronto, for the Civic Transportation Commission, the London Street Railway is worth $1,000,000 approximately. The report explains that the system is worth the amount named as a street railway property, "in use and useful," and refers only to its physical value. The report then deals with what should be an ideal system for this city. Dundas street is London's principal artery, and the opinion is given that all lines, for the main portion of the city, should run north and south from Dundas.

Peterboro, Ont.

The Canadian General Electric Company recently received a sizeable order from the Canadian Government Railways.

Portage la Prairie, Man.

Portage la Prairie has fixed a new schedule of rates for it's electric power. The domestic and commercial rate is increased from nine cents to 12 cents, while the minimum is increased from $1 to $1.50. Portage is on the hydro-power line, but for some time has been using the steam power as the transmission line was out of business for nearly two months.

Toronto, Ont.

The statement that serious consideration was being given to the advisability of making plans for the construction of a second canal at Chippawa to duplicate the power generating capacity there, in order to take care of power demands which would exist in this section of the Province by the time the second Chippawa plant would be ready for work was recently confirmed by Sir Adam Beck. Regarding water for the second canal Sir Adam said: "In our agreement with the United States we are allowed a water diversion of 58,000 cubic feet per second. The Chippawa canal uses 18,000 second feet. We could build another canal and scrap both old plants as we have scrapped one. We would have 40,000 second feet available."

Vancouver, B. C.

There is abundant opportunity for the development of water power throughout the area immediately adjacent to Vancouver, with the necessary elevation and rainfall to permit of the creation of a hydro-electric system sufficient to meet the needs of the city for many years to come, in the opinion of Mr. J. G. Kerry, of Kerry & Chace, Toronto, consulting engineer engaged by the city to conduct an investigation into possible water power sites in the district, with a view to the city acquiring its own power system. All government land within a radius of 100 miles from the Vancouver city hall will be withdrawn from filing and set aside as a crown reserve for waterpower development, if recommendations made to the government by Mayor C. E. Tisdall, are approved at Victoria. Mayor Tisdall had a conference with the government, following submission of a preliminary report by Mr. Kerry.

The Canadian Marconi Company, in co-operation with the parent company in England, is contemplating erecting at Vancouver what will probably be the largest and most powerful wireless station in the world, for direct communication with Australia and the East. It will cost upward of two milion dollars, and will be the last word in modern wireless installation. Whether the work will be proceeded with or not depends to a large extent on the attitude of both the Canadian and British Governments. Mr. H. W. Allan, joint manager of the Marconi Wireless Telegraph Company of London, and S. F. St. John Steadman, director of the company, also of London, have been in Ottawa interviewing the Government on the matter, and have made formal application for a license to proceed with the work at the earliest possible date.

Vernon, B. C.

A by-law making several changes in light and power charges, was recently presented to the council. The by-law aims to encourage sign and window lighting by a modification in existing rates. Motor service is taken on the basis of a yearly signed contract. Minimum rate on heating appliances is $1.50 a month. It is proposed to raise the rate on water heaters to 1¼ cents, less 10 per cent, per kw.h.

Victoria, B. C.

The Sun Electric Company's tender for wiring for telephones and radio in the new Jubilee Hospital building was accepted by the Hospital Board. Others tenderers were the Murphy Electric Co. and Hawkins & Hayward.

Winnipeg, Man.

Seeking control of radiotelephony, executives of the Western Provinces Government telephones systems will recommend, through the Ministers of Telephones to their respective Legislatures, the transfer of authority from the Federal to Provincial Governments of the enforcement of the Radio Telegraph Act dealing with radiotelephony.

High River, Alta.

Mr. P. Terry, mechanical engineer, of the municipal light plant at High River, Alta., has secured a position as mechanical engineer and will superintend the Vulcan light and power plant at Vulcan, Alta.

Drumheller, Alta.

The Lines Electric Co., Ltd., of Drumheller, Alta., have recently been awarded the contract for wiring and lighting fixtures, for one store and six offices. Owner J. Gouge.

The Valley Electric Co. of Drumheller, Alta., were recently awarded the contract for wiring the new municipal hall at Drumheller, Alta.

The Drumheller Co., Ltd., Drumheller, Alta., are installing a new tribune in their power house.

The Mine Power Company Ltd., Drumheller, Alta., are installing two Leonard horizontal return tubular boilers, 150 h.p. each, forced draught, and fitting them up for future installation of Jones underfeed stokers; also installing one 300 kw. Curtis turbine and voltage regulator to take care of entire load; also contemplate an additional two miles of line work.

Wiring Contracts Awarded

Barrie, Ont.

W. Stephenson, $3,000 res., 15 Bersey St.

Bridgeburg, Ont.

Anger Electric Co., $10,000 res., Niagara Bld.

Brockville, Ont.

Code & Lett, $10,000 add. to factory.

Bronte, Ont.

Wm. McDonald, $7,000 on res.

Chatham, Ont.

H. Cartier, 112 Sheldon Ave., $38,000 school, Victoria Ave.

Hamilton, Ont.

Mr. Smith, $2,500 res., Connaught & Cannon Sts.

L. H. Lander, 155 King Street E., altn. office bldg., Lister Bldg.

John Dynes, Prospect St., $10,000 apt., Emerald W.

Kingston, Ont.

J. Harris, Cooper St., $20,000 curling rink, Clergy St. W.

Kitchener, Ont.

Doerr Electric Co., 214 King St. W., $30,000 building., 83 King St.; $7,000 res., Homewooed Ave.; $3,500 res., Henry St.

Chas. Schmidt, King & Scott Sts., $4,000 res., Lancaster St.

Star Electric Co., 91 King W., $8,500 res., Wellington St.; $4,700 res., St. Leger St.

Milton, Ont.

Harry Alexander Ltd., 6 King St. W., $75,000 office & warehouse.

Mimico, Ont.

Roxborough Ltd., 36 Front E. Toronto, $10,000 res. Lake Shore Rd.

Warner & Fordyce, $4,500 res., Lake Shore Road.

Moncton, N. B.

Wm. G. Crowley, St. George St., $3,500 res., Caledonia St.; $6,000 res., Cornhill St.

Edgar LeBlanc, Church St., $5,000 res., Archibald St. Extn.

Montreal, Que.

J. Artiz & Co., 1395 Bordeaux St., $14,000 res., Delormier Ave.

Booth Bros., 5727 Sherbrooke W., $200,000 24 res., Oxford Ave.

G. Houle, Verdun, $7,000 res., Mariette.

O. Labelle, 332 Seigneurs St., $8,000 res., Montclair Ave.

Mr. Mantiel, $35,000 pr. semi-det. & single res., Old Orchard.

F. Neyrinck, 809 De Gaspe St., O'Shaughnessy.

J. A. St. Amour, 2173 St. Denis St., $170,000 school and res., "St. Anselme"; $200,000 school "St. Arsene Parish", Christophe Colomb.

Sayer Electric Co., 87 Bleury St., $28,000 presbytery, Delorimier.

A Seguin, 1305 Bordeaux St., $50,000 altn. res., 65 Drummond St.

Mount Royal, Que.

Sayer Electric Co., 87 Bleury St., on residence.

North Sydney, N. S.

Ellis & Co., $7,000 res., Queen St.

McKinnon & Coleman, $3,000 store, Stanley St.

North York Twp., Ont.

G. McKee, Bellwoods Ave. Toronto, on add. to school.

Ottawa, Ont.

P. Ackroyd, 416 Bank St., $13,000 duplex res., 1st Ave.

H. L. Allen, 272 Bank St., $5,000 res., Bayswater Ave.; $9,000 garage, Coulborne Ave.

A. Aubrey, $5,500 res., Rockwood Ave.

Jos. Burns, $5,000 res., Stewart St.; $5,000 res., 1st. Ave.

W. Cherry, Rideau Terrace, $6,000 res., Pansy Ave.

E. Headly, 645 Echo Dr., $5,500 res., Aylmer Ave.; $5,500 Ossington Ave.

Mr. McClelland, $5,000 res., Grove Ave.

Mr. Rennie, $5,500 res. & garage, Metcalfe St.

Rideau Electric Co., Daly Ave., $4,500 res., Helena Ave.

G. Young, Spruce St., $6,000 res., Ossington Ave.

Sayer Electric Co., 87 Bleury St., $60,000 four cottages, Dollard Ave.

Quebec, Que.

F. Gingras, 34 St. Augustin St., $40,000 add. store., St. Joseph & Liberte Sts.; $125,000 alts. bank, St. Peter St.

A. Picard, 199 St. John St., $27,000 add. school, St. Joachim St.

Regina, Sask.

Espley Elec. Co., 2160-12th Ave., $3,500 res., 16th Ave.

Rockcliffe, Ont.

E. Headly, 645 Echo Drive, $6,500 res., Cloverdale Rd.

St. Catharines, Ont.

H. C. Holmes, 30 Ann St., $4,000 res., George St.; $4,000 res., St. George St.

Sandwich, Ont.

A. H. Cook, 609 Moy Ave., $10,000 three family terrace, London St. & Indian Rd.

Jno. Maillaux, 1420 Erie St. E., $3,500 res., Rankin St.

Sault Ste Marie, Ont.

J. Penfold, 76 Pim St., $3,500 res., Forest Ave.

Taylor Bros., Gore St., $3,000 res., Spruce St.

Three Rivers, Que.

J. B. Badeaux, 446 St. Maurice St., $30,000 extn. convent, St. Charles.

Toronto, Ont.

Geo. Arbour, 27 Belsize Dr., $7,500 store & apt., 2476 Yonge St.

Geo. Armstrong, 1391 Ossington Ave., $75,000 6 stores & apts., St. Clair West.

Canada Electric Co., 175 King E., $40,000 rebldg., loading platform & cattle pens, Union Stock Yards.

Cavers & Harvie, 702 Brock Ave., $7,000 each, Yonge & Erskine Ave.

W. Chittingdon, Earlscourt Ave., $4,500 res., Earlscourt Ave.

J. A. Craig, St. Annes Rd., $18,000 4 det. res., Glendale Ave.

Douglas Bros., 2317 Yonge St., $4,500 res., 54 Hillsdale Ave.; $9,000 1 pr. res., Duplex & Hillsdale Ave. E.

Douglas Electric Co., 2525 Yonge St., $7,000 res., Stibbard Ave.

P. J. Dunn, 3150 Dundas W., $10,000 each 3 res., Patterson Ave.

H. J. G. Ferguson, 69 Boon Ave., $12,000 res., Glen Grove Ave.

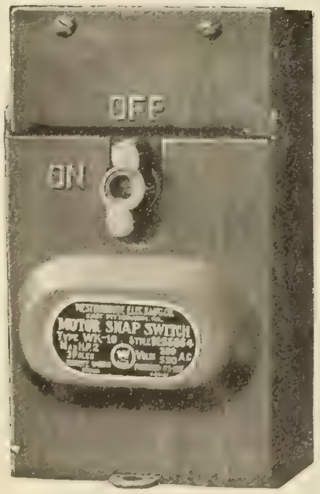
Geo. Armstrong, 1391 Ossington Ave., on res., 112 Westmount Ave.

Walkerville, Ont.

W. T. Carthew, 138 Moy Ave., Windsor, $18,500 res., Devonshire Rd.

A Well Known Product Added to Our Line

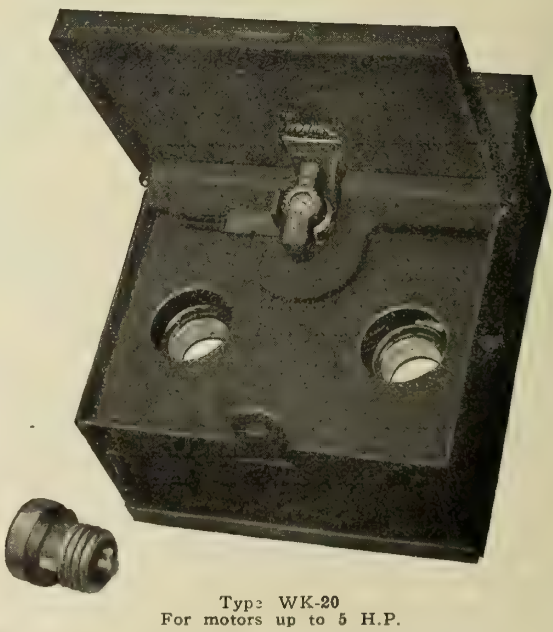
Krantz Type WK-10 and
WK-20—Safety Motor Starters



Type WK-10
For motors up to 2 H.P.

For starting small single phase and three-phase motors. 125-250-440-550 Volts A.C. Approved by Board of Fire Underwriters, also H.E.P.C.

Complete description and prices of these starters promtly forwarded.



Type WK-20
For motors up to 5 H.P.

DISTRIBUTORS

Canadian Drill & Electric Box Co., Limited

1402 Queen St. East, Toronto, Ontario Phone Gerr. 554

Retail Marketing Tips

Washing Machines

—That will make you money

Brand the Idea on The Public Mind

"ELECTRIC WASHERS MAKE IDEAL CHRISTMAS GIFTS!"

Now is the time to push electric washers as Christmas gifts. Faintly at first, but with ever increasing intensity, the minds of men are asking themselves the question—"What shall I give her?"

The electric washer answers the question—**tell** them that it does! An electric washer gift:

1. Pleases the recipient.
2. Adds to the general smooth-running of the home.
3. Is a good monetary investment.

The elaboration and presentation of these points will sell washers—they answer the question each householder is asking himself.

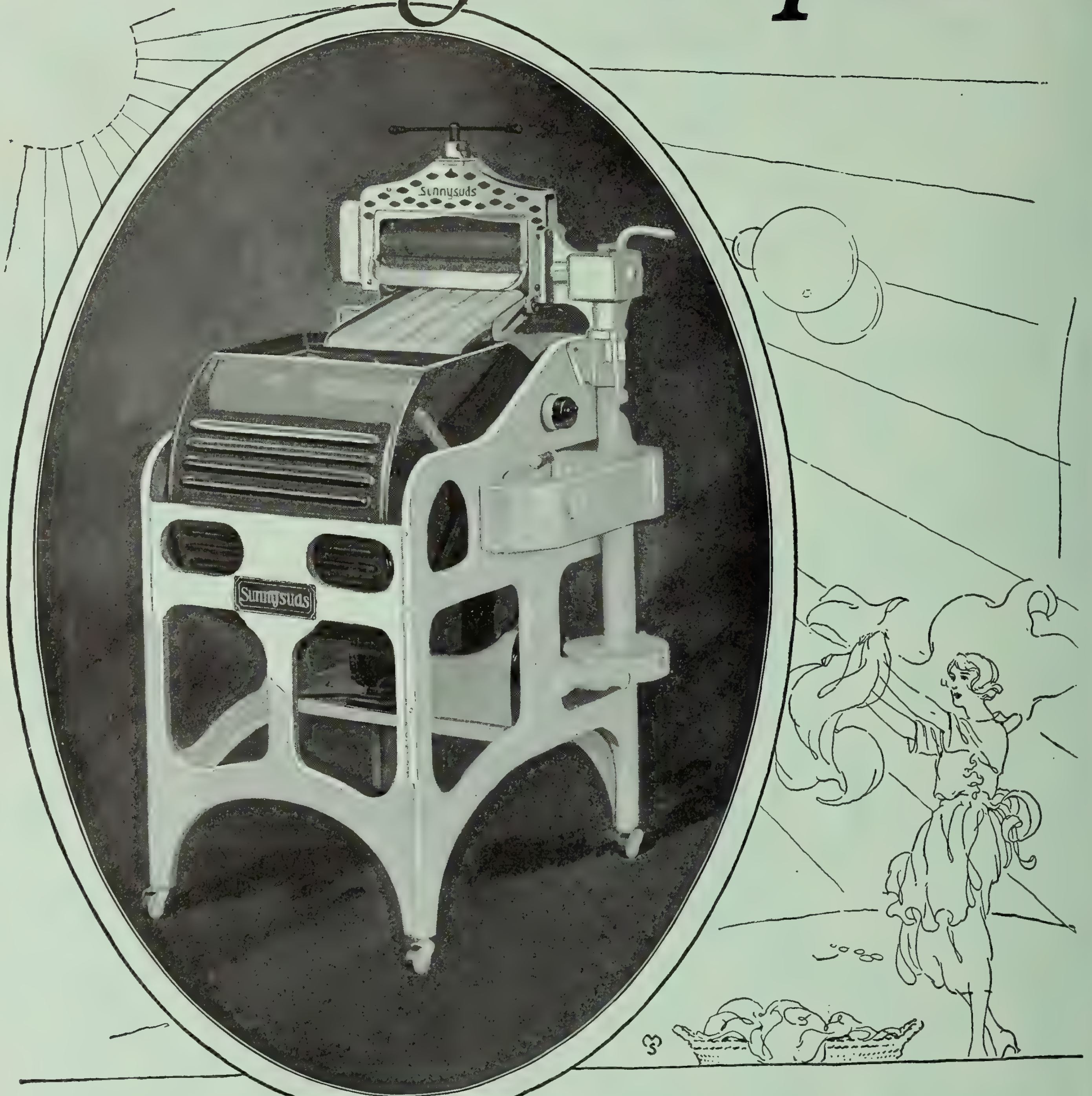
John B. Gilpin has been selling dozens of washing machines this year. Now he is planning to sell one machine a day on the Chrismas gift idea. Here is how he got his prospects:

1. First, he had a clerk stationed at the door with orders to say to every woman who passed out "Madam may I present you with a package of this new soap powder for your electric washer?" And if Mrs. Housewife had **not** an electric washer, she naturally said so. This procedure resulted in a bunch of prospects.
2. Then he gave credits for $5.00 worth of electricity with each machine. Advertised this extensively, of course, stressing the fact that it would pay for electricity for so many years.
3. Another strong feature of his propaganda was an installment plan of payment. Only a small sum down and the machine was in the home—this was a point that he brought out prominently in his conversations and,
4. Latterly, he has pushed the Christmas gift idea using suitable window trims and regular demonstrations. This is a strong point, he believes, and he has worked it for all it was worth.

Good luck to John Gilpin! He has passed out fifteen washing machines in the last two weeks. His aggressive merchandising deserves a doff of the hat from the electrical trade.

MAKE THIS CHRISTMAS SALE YOUR BEST

The Popular



Sunny

SUNNYSUDS

ELECTRIC WASHER & WRINGER

MADE TO SELL AT **$150** *COMPLETE*

WINNIPEG AND WEST $165

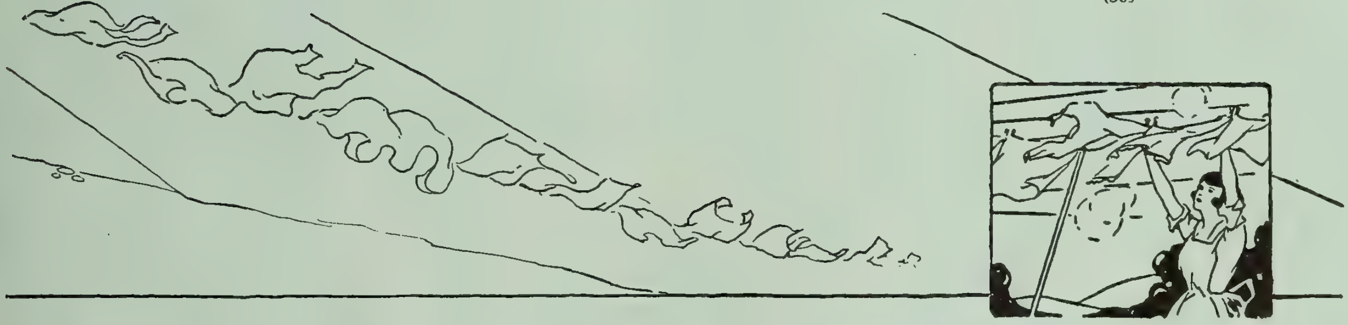
The opportunity for unusual profits offered by the Sunnysuds is based on three things. Strong construction and efficient designing have combined to produce a machine which lasts longer and does better work. Quantity production permits of an unprecedented low retail price being asked. Dealers are backed with the sales co-operation of one of the finest merchandising services in Canada.

These three features are making it easy for Sunnysuds dealers to vastly increase their sales and profits. The market is almost unlimited and the appeal of a modern electric washer complete for $150 is proving irresistible. Take advantage of it.

WRITE FOR FULL PARTICULARS. DO IT NOW.

ONWARD MANUFACTURING COMPANY
KITCHENER - ONTARIO

(30)



suds Electric
Washer
&Wringer

The Popular Machine

The machine careful people are buying

We have some territories still open in Quebec and Maritimes, and a few in Ontario.

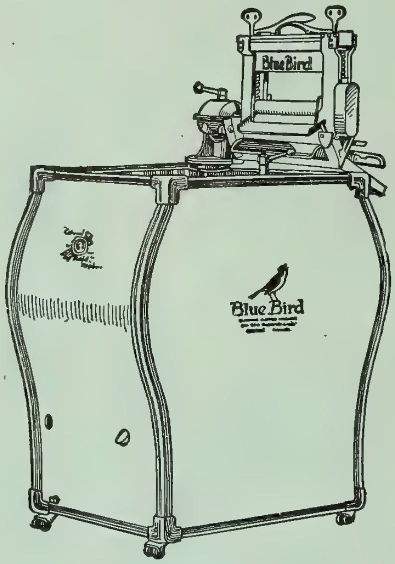
Get your contract now.

This is the time for washing machine sales, and "Bluebird" leads now as always.

BLUEBIRD CORPORATION LTD.
BRANTFORD, ONTARIO

"COLONIAL MAID" WASHES BETTER

Blue Bird
ELECTRIC CLOTHES WASHER



"The service it gives and the service it doesn't need are what count."

The Safe Machine

The machine leading dealers are selling.

Have you yet secured your exclusive agency contract.

Special sales help given:—
- Advertising matter.
- Re-sale men.
- Club sales organized.
- Lady demonstrators.
- Time payments financed.

If we can do anything more to firmly establish you as the leader in your district for washing machine sales, we will try and do it.

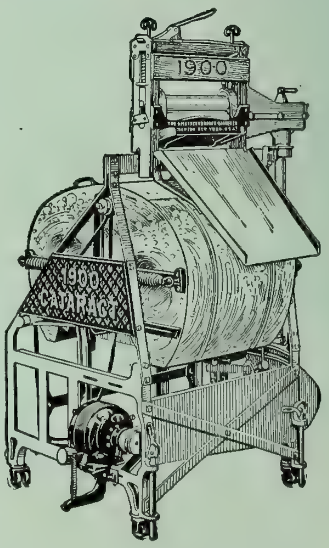
The 1900 Cataract

THE Electric Washer which has the best washing principle. No other Washer has that Fig. 8 movement which combines the oscillating principle with a pitching motion of the water. This Figure 8 motion is patented.

The Cataract not only rocks the water and clothes back and forth as in ordinary washers of the oscillating type but it actually lifts the water at each end of the machine alternately and pitches it with tremendous force.

It is a washer that has a continent wide reputation of being the best oscillating type on the market to-day. Both domestic and laundry sizes of the Cataract Electric are supplied by us. Thousands of these are in use in every State and Province on the North American Continent.

Manufactured by the Leading Washer Manufacturers in Canada To-day



BEATTY BROS. LIMITED

HEAD OFFICE: Fergus, Ont.

BRANCHES AT: London, Ont.; Winnipeg, Man.; St. John, N.B.; Montreal, Que.; Edmonton, Alta.; Vancouver, B.C.; London, Eng.

A B C's
Sure are Selling!

- The finest washer built
- Cylinder reverses after each revolution
- Aluminum wringer—locks in any of 20 positions
- 50% oversize motor
- All gears machine cut
- Quiet and vibrationless in operation

At Vancouver, the David Spencer Company—a new A B C dealer—sold 18 *Super Electrics* at $180 each during the first two weeks. Latest reports indicate that this pace is being splendidly maintained.

Strickland, Swain & Patrick, recently appointed as A B C Distributors in British Columbia, are out to help their other dealers in a similar manner.

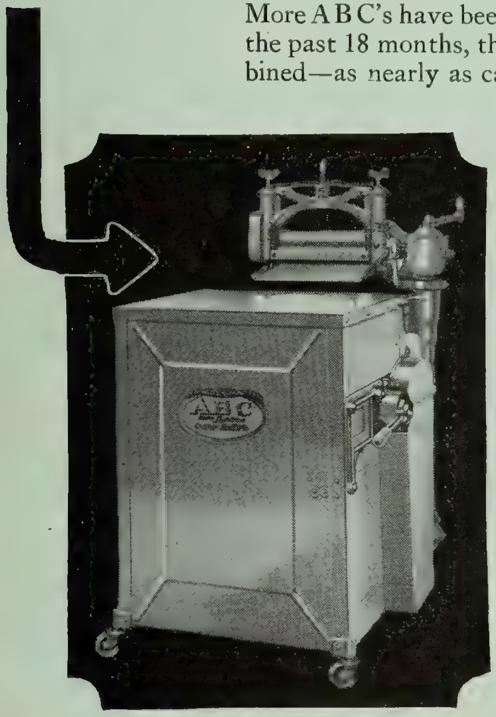
About fifty ABC *Alco's* have been sold so far this year by Ellis & Howard at Kitchener, Ontario—a city of approximately 20,000.

More A B C's have been sold in the Maritimes, the past 18 months, than all other makes combined—as nearly as can be determined. Blackadar & Stevens, the A B C Distributors, are on their toes assisting our dealers along real specialty selling lines.

These are just a few examples. Space forbids quoting more. In every province, A B C's are selling fine. In fact the A B C Line is showing the most rapid gains in sales of any important line of electric washers on the market.

An established reputation, matchless values, a complete line, liberal dealer discounts and real co-operation—these are some of the principal reasons that are making the A B C Line the leader.

Get our proposition. It bristles with good features. Write or wire today.



A B C "Alco" Washers
(Dolly or rub board)

No. 51, single tub, engine drive
No. 52, double tub, engine drive
No. 51-E, single tub, ¼ h. p. motor
No. 52-E, double tub, ¼ h. p. motor

A B C Electric Oscillator

Greatest value ever offered at the price. Full size 6-sheet copper tub, swinging wringer, springless mechanism. Rigid frame. Enclosed parts.

No. 80-E $135

ABC
SUPER ELECTRIC
$170

With Copper Tub—$200

All prices quoted are retail, except in B. C. and the Maritimes

ALTORFER BROS. COMPANY, Peoria, Illinois
Pioneer and Leading Makers of Washers and Ironers

Canadian Office, Box No. 123, Brantford, Ont.

Wholesale Distributors

MARITIME PROVINCES
Blackadar & Stevens, Roy Building, Halifax, N. S.

ALBERTA
Cunningham Electric Co., Ltd., Calgary

SASKATCHEWAN
Sun Electrical Supply, Ltd., Regina

ONTARIO
Masco Co., Ltd., 78 Richmond St., Toronto

QUEBEC
Dawson & Co., Ltd., 128 Bleury St., Montreal

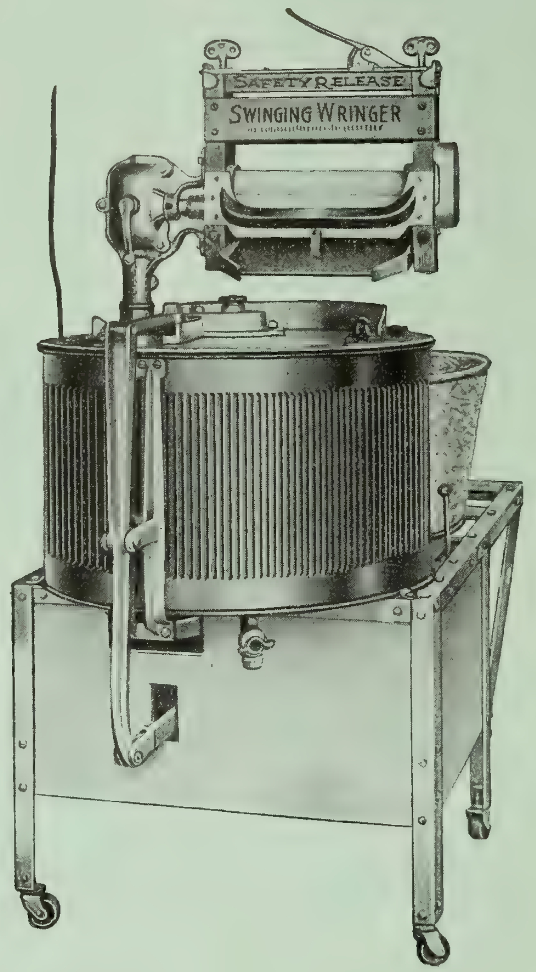
BRITISH COLUMBIA
Strickland, Swain & Patrick, 707 Fort St., Victoria

ANNOUNCING

The

Connor Copper Tub Electric Model 4C

which further completes the Connor Line.



A Few of Its Unrivalled Features:

Polished Copper Tub

Polished Aluminum Cover

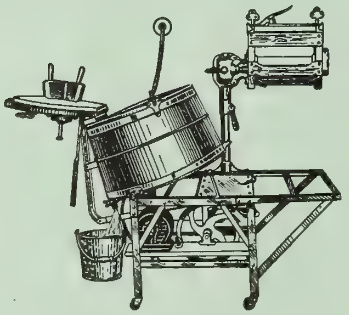
Polished Aluminum Feed Board and Drain Board on 12" Swinging Wringer

Steel Stand Galvanized

¼ H. P. Motor

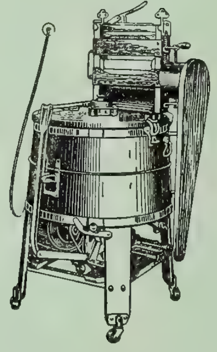
Extension Folding Bench

Easy Rolling Casters



**Connor Electric Model 2
Wood Tilting Tub
Swinging Wringer**

**Connor Perfection
Electric
Swinging Wringer**



**Connor Economy
Electric
Stationary Wringer**

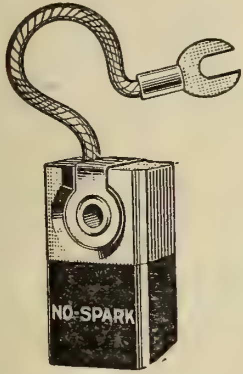
J. H. Connor & Son Ltd., Ottawa, Ont.

311 Chambers St., Winnipeg, Man McPherson & Dietzel, Vancouver, B.C.

There's a big difference with

No-Spark Carbon Brushes

They reduce the wear on machines 90% because the lubrication lasts. Your men will know the advantage of NO-SPARK brushes over the average carbon brush.



NO-SPARK brushes will not chip, split, or crumble, and by containing lasting lubrication they provide frictionless contact, eliminate noise, and produce a permanent glazed surface on the commutator bars. Full details and prices on request.

CALEBAUGH
Self-Lubricating Carbon Co.
1503 Columbia Ave., PHILADELPHIA, PA.

Canadian Representatives: Electrical Equipment Company, Limited, Montreal, Canada.

Dominion Engineering Agency, Limited
D. M. Fraser, Pres.
24 Adelaide St. E., Toronto, Ont.

Montreal District Representative:
E. W. Playford, - 358 Beaver Hall Square

ENGINEERING SPECIALTIES:

I-T-E Circuit Breakers and U-Re-Lites
Cutter Elect. & Mfg. Co., Philadelphia

Hi-Tension Air Break Switching and S & C Fuses
Schweitzer & Conrad. Inc., Chicago

Industrial Control, A.C. or D.C., Hand or Auto.
Sundh Electric Co., Newark, N.J.

Elec. Motors—Robbins & Myers, Brantford, Ont.

Rawlplugs—Inventions Ltd., Montreal, P.Q.

"May we send you particulars of the equipment in which you are interested?"

Sacrifice Sale of New Electrical Equipment

SYNCHRONOUS MOTOR

1—500-H.P. 360 RPM, 2300-volt, three bearings with direct connected exciter.

TRANSFORMERS

3—75-K.V.A. 2200-volt primary, 550-volt secondary.
1—10-K.V.A. 2200-volt primary, 110-volt secondary.

All complete with oil and for 60 cycle circuits.

SWITCHBOARD EQUIPMENT

1—3000-volt Aluminum cell arrester with 300 ampere choke coils and disconnecting switches.

1—Line panel.
1—Synchronous motor panel.
1—Transformer Panel.

All equipment Canadian General Electric Manufacture and is in original crates, never having been used, due to changes in plans.

For sale, all or in part, at attractive prices which will be furnished on application.

LAKE OF THE WOODS MILLING COMPANY LTD.
WINNIPEG, MAN.

The Electrical Dealers' Opportunity

RADIO

Equipment For Profitable Sales

Important Announcement

We take pleasure in announcing that we have opened a Radio Division and that we now are going into production on Headset Receivers, Receiver Plugs and Jacks.

A limited number of high class Crystal Receiving Sets (Variometer type) are now available for delivery.

Radio Dealers: Write for full information and prices.

Contracts: Enquiries solicited from responsible parties wishing to contract for the manufacture of non-patented Radio Appliances.

Caron Brothers, Inc.
Radio Division
233-239 Bleury Sreet - Montreal

RADIO HEAD PHONES

World's Largest Distributors of

Radio Head Pieces

We represent 30 manufacturers, showing 75 types and designs, priced from $5.00 to $15.00. Following is a partial list of manufacturers:

Manhattan
Frost-Fones
Connecticut
Leich
Dictagraph
Corey
Everett
Elwood
Thompson-Levering
Western Electric
American Electric
Holtzer-Cabot

Phones on hand for immediate shipment. Ask us for the phone you want. Special—100-ohm single receivers made by old reliable telephone maker. List—$2.50. Agents Wanted Everywhere. Get literature and discount sheet.

B. E. POLCZYNSKI & CO.
169 Capitol Bldg. - 1550 Broadway
Detroit, Michigan, U.S.A.

WIRELESS

"ESCO" Motor-Generators for Generation of High Voltages

NORTHERN ELEC. CO.—Complete Peanut Tube Receiving Sets

JEWELL INSTRUMENTS
CONDENSITE-CELORON
BAKELITE—Complete assortment of Panels, Sheets, Tubes, Rods.

EVERETT PHONES, FROST PHONES
CHELSEA CONDENSERS

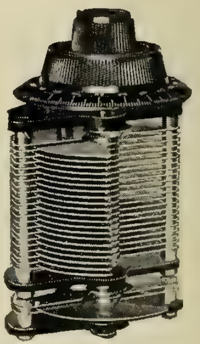
Price List on Application

Dealers are asked to write for special discounts

BROCK RADIO Co.
B.L.SILVER RADIO ENG.
357 S^t CATHERINE S^t W. MONTREAL. PHONE-UP.6861

It PAYS To Sell

"United" Radio Products



They are scientifically correct in proportion and design. They are made from the best materials in a careful, workmanlike way. And, like a famous cigarette,

"They Satisfy"

Buyers swear by them not at them. Every user becomes a booster. And that means a lot in the freemasonry of radio.

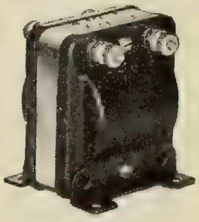
"United" Variable Condensers with Vernier Scale Attachment Made of Hard Aluminum
with Bakelite ends. The only Vernier with stop

46 plate	$6.50	complete like cut
26 plate	5.50	

"United" Variable Condensers (Plain)

43 plate	$4.50	5 plate	$2.75
23 plate	4.00	3 plate	2.25
11 plate	3.50	without dial or knob	

"United" Audio Transformers



Pat. Applied for

Audio-frequency, amplifying, magnetically shielded. A beautiful piece of workmanship. Gives loud, clear signals without howl or distortions.

Best value on the market......$4.50

"United" Products

have been adopted as standard equipment by leaders in the radio industries. Their endorsement and continued patronage carry more weight than all the advertisements that were ever written.

Send for Circular

UNITED MFG. & DISTRIBUTING CO.
CHICAGO 536 Lake Shore Drive ILLINOIS

Looking Ahead

Owing to the increased volume of business we have secured larger premises at

29 Duke Street, Toronto

On and after October 15th, 1922, we will be in a position to meet your demands for High Grade Radio Parts.

Tomlinson & Forbes
216 Victoria St., Toronto

STANDARD

Wires and Cables

include bare and insulated, lead covered and armored conductors of all kinds and sizes and for all classes of service.

Catalogues upon request.

Standard Underground
Cable Co. of Canada
Limited

Branch Offices and Warehouses:
Montreal, Toronto, Hamilton,
Winnipeg, Seattle.

STANDARD TRADE MARK

The Best for the Purpose

FOR HEAT RADIATION
"INSULDERM"

This heat-radiating compound gives great depth of insulation and quickly conducts coil-generated heat to the exterior, ensuring cool working. It is damp and oil-proof, flexible, protective, quickdrying and will not crack under the most severe stresses. It also prevents sparking at commutator ends.

FOR MICA INSULATION
"STICOLENE"

A superior varnish for building up Mica into plates, rings, tubes, collars, etc.

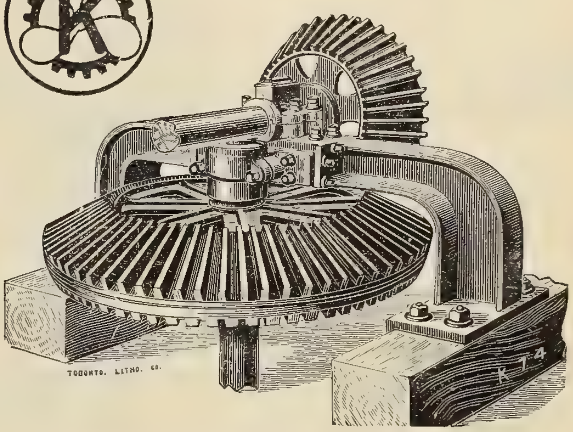
For Core Plates--"DISCUM"

A hard drying varnish for core plates that can be air dried or stoved in 30 seconds. May be brushed, rolled or sprayed and once on will not squeeze out.

SPIELMAN AGENCIES (Regd.)
45 St. Alexander Street - Montreal

Ottawa...........J. W. Anderson, Bank St. Chambers
Toronto.........Joseph Supply Co., 46 Colborne St.
Winnipeg..............Wm. A. Goold, 39 Charlotte St.
Halifax........R. R. Power, 311 Royal Bank Building

KENNEDY
Transmission Machinery


TORONTO. LITHO. CO.

We have the largest range of patterns in Canada for gears, pulleys, bearings and bridgetrees. We build transmission machinery to any specifications.

The Wm. Kennedy & Sons, Limited
OWEN SOUND ONTARIO.

District Representatives:

M. B. SAUNDERS,
8 Silver St., Cobalt,
Phone Cobalt 153.

L. A. MITCHELL,
1091A Bathurst St.,
Toronto,
Phone Hillcrest 2014.

H. C. KENNEDY,
232 St. James St.,
Montreal,
Phone Main 394.

American Electric Co. Reg.
Wholesale Jobbers

Exclusively wholesale to dealers and contractors..

Full assortment of Electrical Supplies.

Lamps of all kinds in stock. Have you seen our New Christmas Tree Outfits?

Before placing your orders call or write for our quotations, you'll enjoy dealing with us,—always ready to meet you half way.

1101-03 St. Lawrence Blvd., Montreal
Phone: Plateau 4864

We specialize in the manufacture of

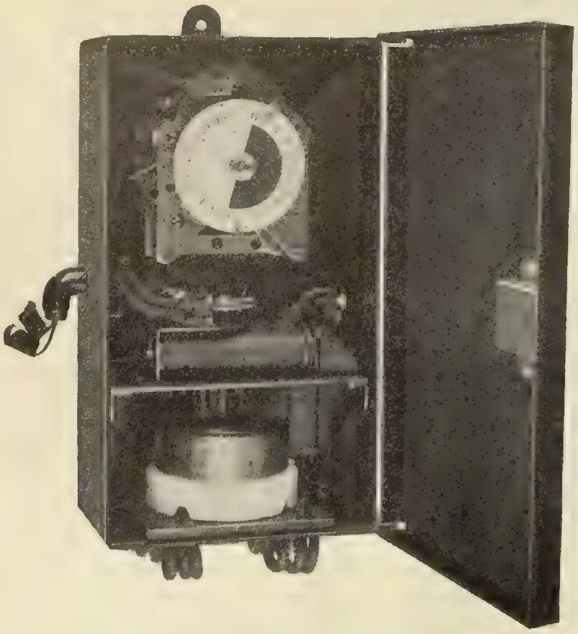
BRUSHES

For ALL TYPES of Motors and Generators

Orders shipped promptly

DOMINION CARBON BRUSH CO.
38 Duke St., TORONTO
E. W. Playford, 358 Beaver Hall Sq., Montreal

At Last, A Self-Winding Time Switch



The only self-winding time switch made.

It is the only one that needs no winding—no attention whatever. And because of this, it means a big yearly SAVING TO EVERY owner.

This time switch does away with the expense of an attendant. It can be forgotten, yet it never forgets. Here is the switch people have been looking for.

Every OWNER of a time switch is a prospect; every one who needs a time switch, and hasn't one can be sold this one. There's a big field and good profit for you.

The Devoe Electric Switch Company

MONTREAL TORONTO

PLACE YOUR ORDER NOW FOR

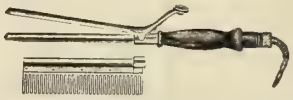
XMAS GOODS

And Assure Delivery

Our Line is More Complete Than Ever

PERCOLATORS — HEATING PADS — CURLING IRONS

IRONS — TOASTERS



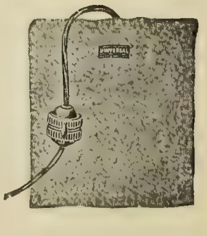
GRILLS — SAMOVARS

TEA POTS

WAFFLE IRONS

VIOLET RAY MACHINES — VIBRATORS — HAIR DRYERS

Inquire About Our Line of Portables



Great West Electric Co. Limited

Winnipeg

Motors in Stock

SECOND-HAND 3 PHASE, 60 CYCLE, 220 V. MOTORS

1—50 H.P. 900 RPM. Westinghouse, Complete
1—20 H.P. 1200 RPM. T.H.E., Complete
1—20 H.P. 1200 RPM. Westinghouse, Complete
1—15 H.P. 1800 RPM. C.W., Complete
1—7½ H.P. 1800 RPM. T.H.E., Complete
1—7½ H.P. 1200 RPM. A.C., Complete
1— 5 H.P. 1200 RPM. Westinghouse
1— 2 H.P. 600 RPM C.G.E.
1— 1 H.P. 1800 RPM. T.H.E.
1— 2 H.P. 1800 RPM.

SECOND-HAND 2 PHASE, 60 CYCLE, 220 V. MOTORS

1—50 H.P. 900 RPM. Westinghouse, Complete
1—24 H.P. 1200 RPM. T.H.E., Complete
1—16 H.P. 1800 RPM. T.H.E., Complete
1—7½ H.P. 1800 RPM. T.H.E., Complete
1— 3 H.P. 1800 RPM. T.H.E.
1— 1 H.P. 1800 RPM. T.H.E.
1—½ H.P. 1800 RPM. T.H.E.

SECOND-HAND 3 PHASE, 25 CYCLE, 550 V. MOTORS

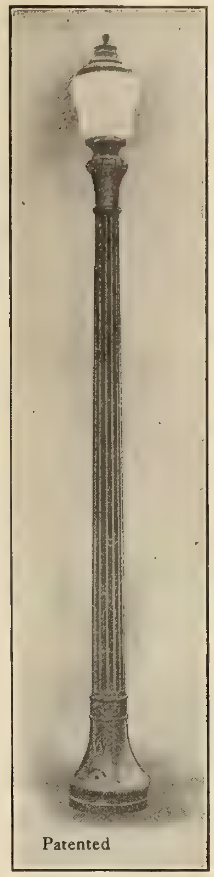
1—50 H.P. 750 RPM. Westinghouse
1— 5 H.P. 1500 RPM. T.H.E.

SECOND-HAND 3 PHASE, 25 CYCLE, 220 V. MOTORS

1—30 H.P. 750 RPM. Westinghouse
1—15 H.P. 750 RPM. T.H.E., Complete
1—10 H.P. 1500 RPM. T.H.E.
1— 1 H.P. 1500 RPM. Westinghouse
1— 1 H.P. 750 RPM. T.H.E.
1— 5 H.P. 1500 RPM. T.H.E.

Toronto and Hamilton Electric Co., Limited

HAMILTON ONTARIO


Patented

Street Lighting Equipment

Up-to-Date Units

To meet every requirement of modern street lighting.

We also represent :

Weston Electrical Instrument Co.
The Bristol Co.
General Devices & Fittings Co.
G. & W. Electric Specialty Co.

A. H. Winter Joyner,
Limited
Toronto - Montreal

SIGNAL

SELLING IS NO SNAP!

But when you sell Signal—whether Radio parts or sets, or any other Signal item—you sell satisfaction. Produced by a plant and an organization whose experience goes back 35 years, there is seasoned knowledge and experienced handicraft in every item. Its finish reflects its character—clean cut, accurate, workman-like in every detail. Each piece will give the service expected of it—and it "looks the part," which counts for a lot to the Dealer.

The *Signal* Line Includes—

- Radio Parts and Sets
- Bells and Buzzers
- Transformers
- Battery Chargers
- Medical Batteries Etc.

Rear view of one of our new Signal Junior Detector Units—a clever and popular arrangement by which a complete wide-range set may be built up, a unit at a time, the first and each succeeding unit complete in itself, but the whole augmented as each unit is added. You should post up on this new development. It is sure to be a big seller.

(1887A)

SIGNAL Electric Mfg. Co.

1903 Broadway, Menominee, Mich.

BULLETIN COUPON

Signal Electric Mfg. Co.,
1903 Broadway, Menominee, Mich.

Please send Bulletins as indicated by X below, to name and address written in the margin of this page.

☐ Radio Equipment.
☐ Bells & Buzzers
☐ Medical Batteries
☐ Bell Ringing Transformer
☐ Battery Charger
☐ Telegraph Instruments

Canadian Line Materials

Limited
TORONTO

Manufacturers of

Pole Line Hardware

Service Brackets

Rural Distribution Fixtures

Write for catalogue and prices.

Business Paper Fundamentals Taught by Daily Newspapers

GLANCE through the pages of any great Daily Newspaper and notice how it tends toward Business Paper practice.

Here is a building section, there an electrical department, again columns of interest to wholesaler, a lumber page, a theatrical page, a sporting page—and next to each you find the advertising relative to the subject in question.

Watch the reader turn to the department in which he is most interested—where the advertising is to be found which will be most likely to appeal to him. So with the business man—as a time-saver, he takes up his business paper to learn the latest developments in his special field. Other publications have but a casual interest for him—because they broaden his general knowledge or afford mental relaxation —but it's the business publication he desires, and requires, when he's thinking of business only. He knows that the business paper will give him the very facts he needs—briefly and **reliably**—in both editorial and advertising pages.

To advertise in business publications places your products before such business men at a time when they're thinking of business.

Lowest Rate Per Interested Reader

Hugh C. MacLean Publications

Electrical News
Canada Lumberman
Footwear in Canada

Canadian Woodworker
Western Contractor and Builder
Contract Record & Engineering Review
Commercial & Retail Merchants' Review

Furniture World
Western Lumberman
Western Coal Review

Head Office: 345 West Adelaide Street

Vancouver Chicago Toronto Montreal Winnipeg

The largest publishers of technical papers in the British Empire, printing in Toronto, Winnipeg and Vancouver. Proprietors of MacLean Building Reports Limited.

Columbia

The Brush It Needs!

WHICH is the most suitable brush for any machine depends on correct analysis of all the relevant facts. That is why the Columbia Data Sheet Service improves motor and generator efficiencies. The essential facts are ascertained by Columbia Brush Specialists. These facts are carefully analyzed by the Columbia Board of Engineers. The Columbia Pyramid Brushes specified as correct for each unit are guaranteed to give satisfactory service.

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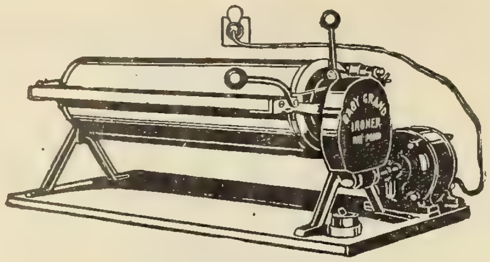

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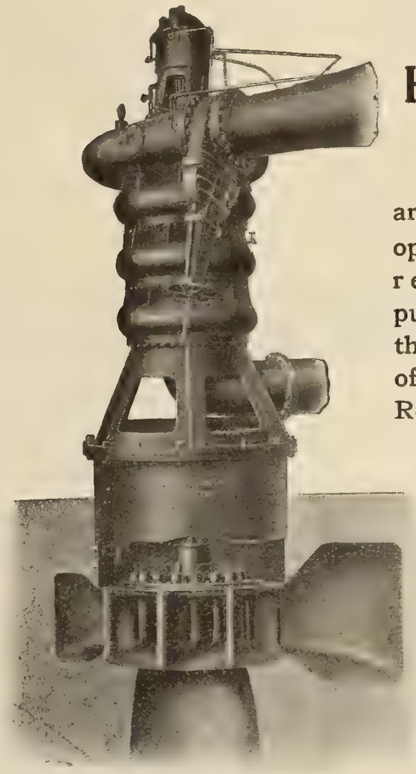

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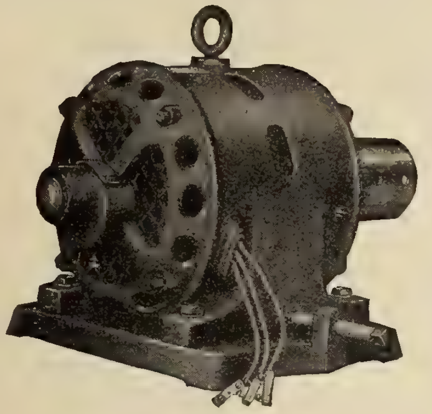

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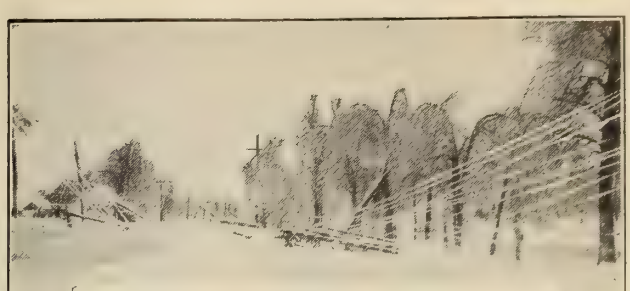

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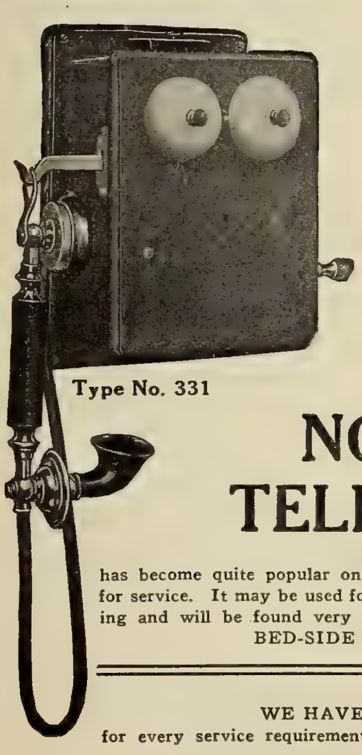

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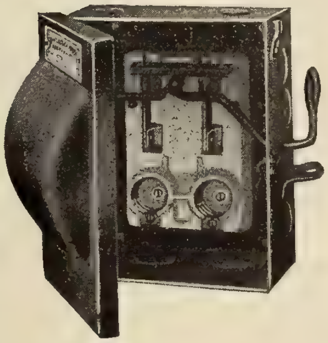

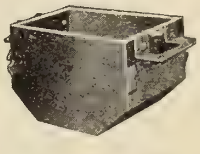

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Direct-Acting Steam Pumps, by Frank F. Nickel.. Published in 1915 by McGraw-Hill Book Company. 258 pages, illustrated. Price $2.00

Electric Railway, by A. Morris Buck, M.E. Published in 1915 by McGraw-Hill Book Company, Inc. 390 pages, illustrated. Price $2.50.

"Engineering Electricity," by Ralph G. Hudson, S.B., 190 pages illustrated. Published in 1920 by the John Wiley & Sons, Incorporated. Price $2.00.

Handbook of Machine Shop Electricity, by C. E. Clewell. Published in 1916 by McGraw-Hill Book Company. 461 pages, illustrated. Price $2.50.

Practical Electric Illumination, by Terrell Croft. First edition, published in 1917 by the McGraw-Hill Book Co. 225 pages, illustrated. Price $1.50.

Principles of Alternating Current Machinery, by Ralph R. Lawrence. Published in 1916 by McGraw-Hill Book Company. 614 pages, illustrated. Price $3.50.

Principles of Electrical Design—D.C. and A.C. Generators, by Alfred Still. Published in 1916 by McGraw-Hill Book Co. 365 pages, illustrated. Price $2.00.

"Radio Phone Receiving." A practical book for everybody. Written by nine specialists. Recently published by D. Van Nostrand Company, 179 pages. Price $1.50.

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"Standard Wiring For Electric Light And Power", by H. C. Cushing, Jr. Twenty-Sixth edition, published in 1920. Reduced price, $2.25.

Telegraph Practice, a Study of Comparative Method, by John Lee, M.A. Published in 1917 by Longmans-Greene & Co. 102 pages. Price 75c.

Telegraphy—A Detailed Exposition of the Telegraph System of the British Post Office, by T. E. Herbert, A.M. Inst. E.E. Third edition. Published in 1916 by Whittaker & Company. 985 pages, 630 illustrations. Price $1.50.

"Theory and Calculation of Transient Electric Phenomena and Oscillations," by Charles Proteus Steinmetz. Third edition, revised and enlarged. Published in 1920 by McGraw-Hill Book Co., Incorporated. 696 pages, illustrated. Price $6.00.

"Testing of Electrical Machinery," for non-electrical students, by J. H. Morecroft. Fourth edition, revised and enlarged. Published by D. Van Nostrand Company, 1921. 220 pages, 111 illustrations. Price $3.00.

The Dynamo (2 volume), by Hawkins & Wallis. Published in 1909 by Whittaker & Company. Price $3.00.

The School of Practical Electricity (Electrician's Course in 2 volumes. Volume 1. Published by Electroforce Publishing Company, Milwaukee, Wis. 410 pages, illustrated. Price- $3.00

The Practical Railway Spiral, by L. C. Jordan, C.E. Published in 1913 by Van Nostrand Company. 155 pages. Price 50c.

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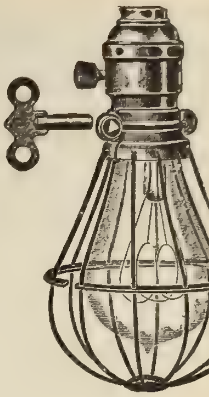

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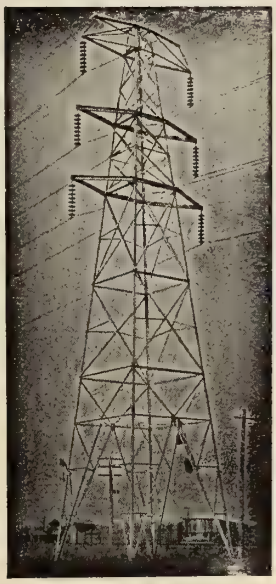

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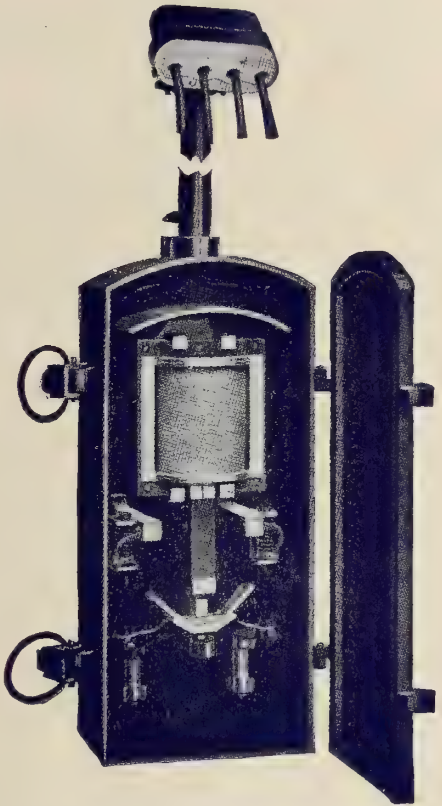

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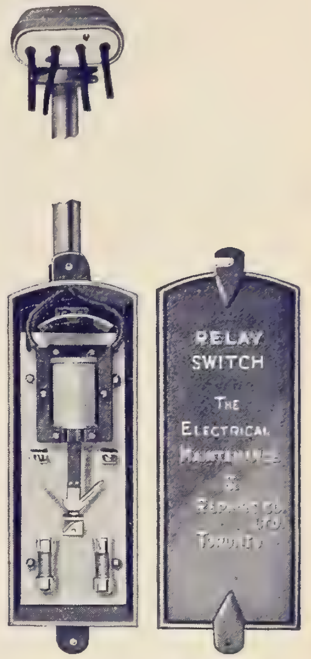

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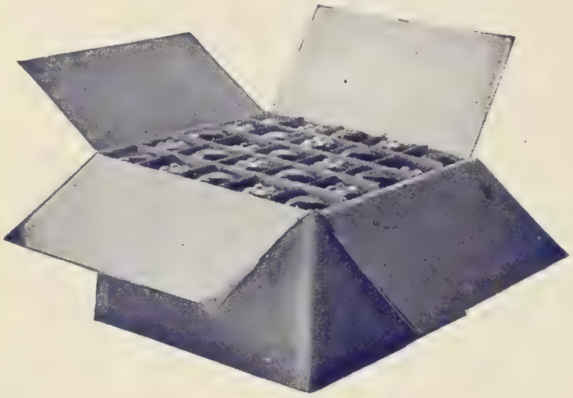

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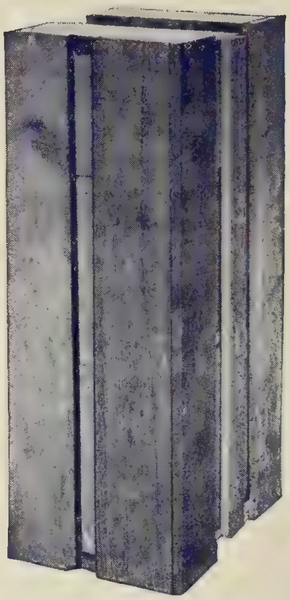

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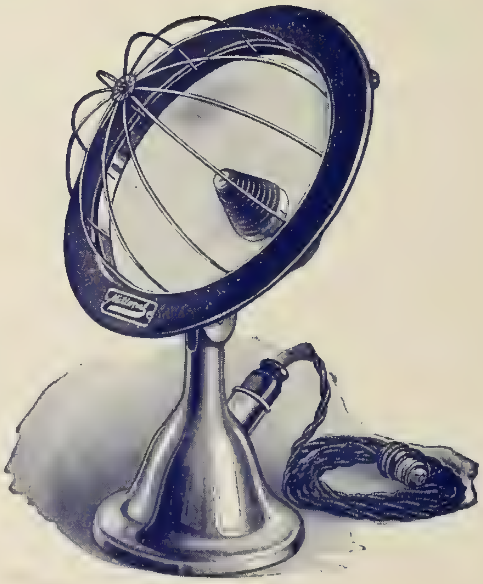

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Vol. XXXI No. 23 Toronto, December 1, 1922

Electrical News

Engineering Contracting Merchandising Transportation

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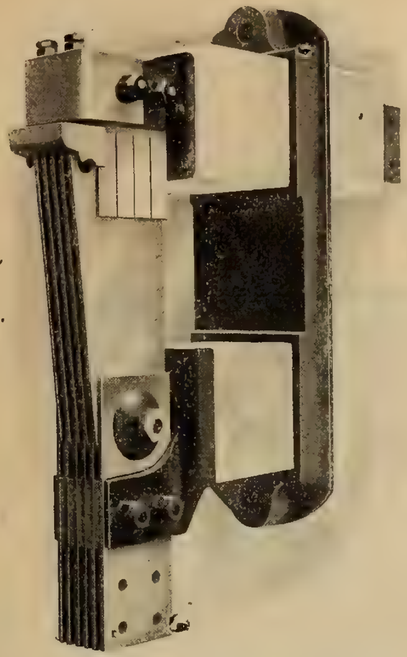
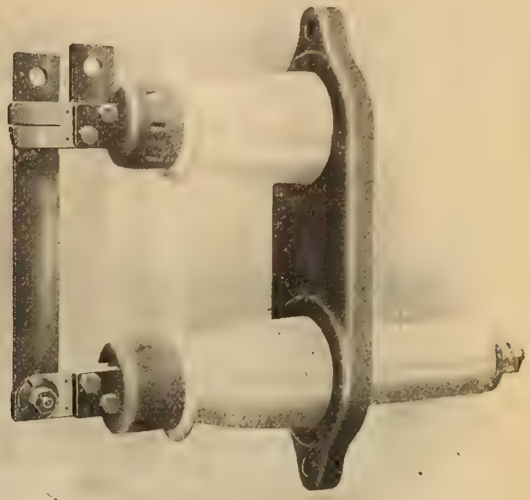


Heavy Duty Disconnect



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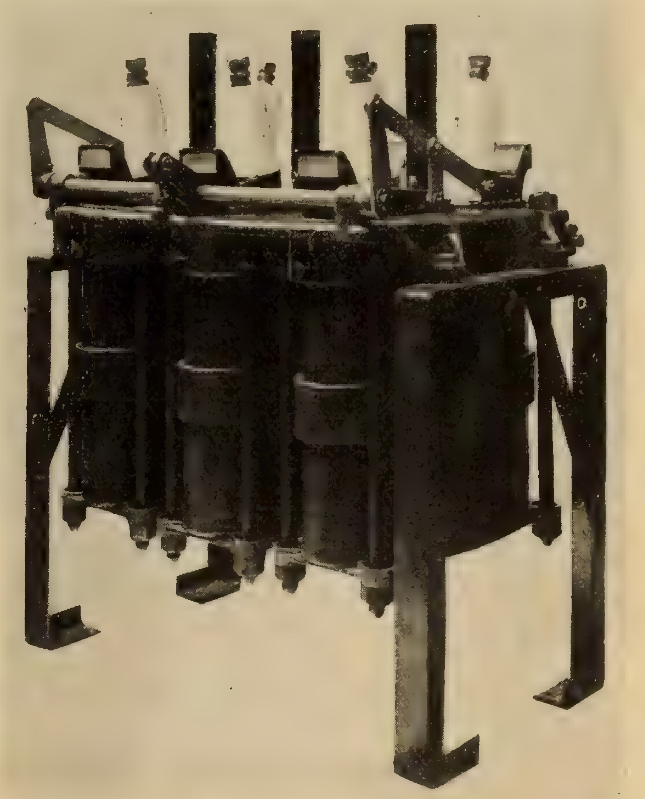

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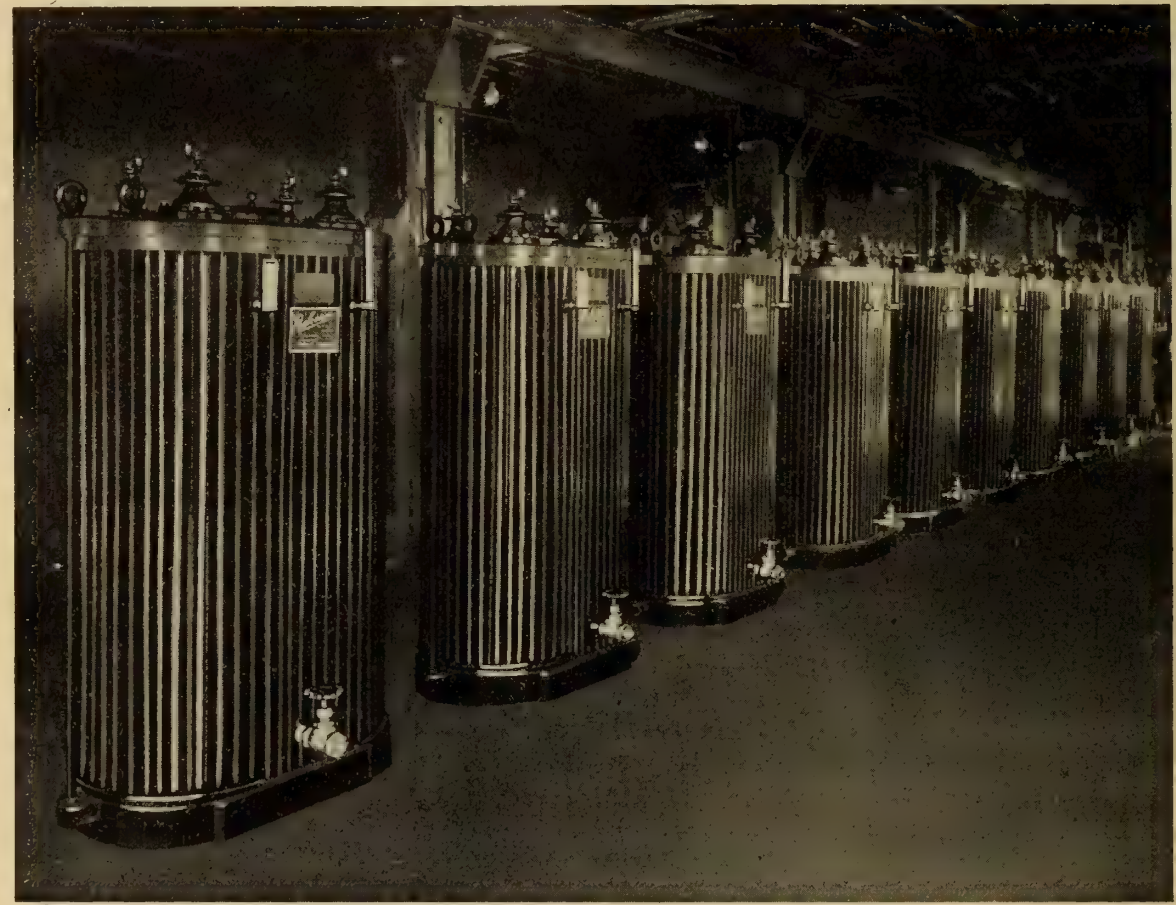

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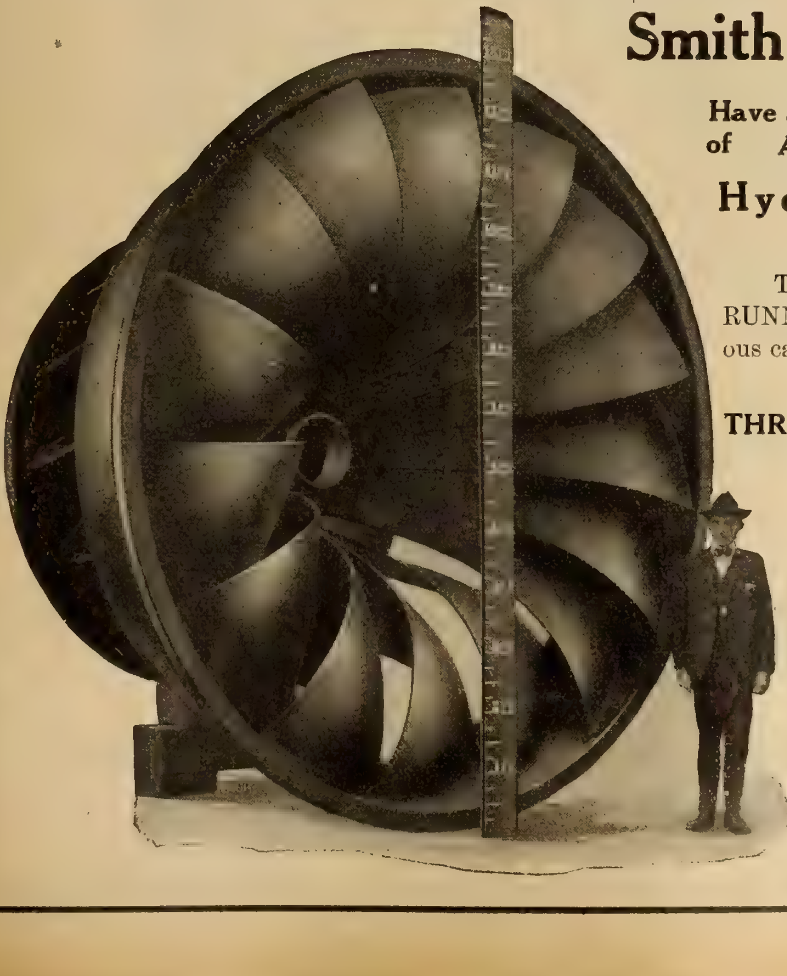

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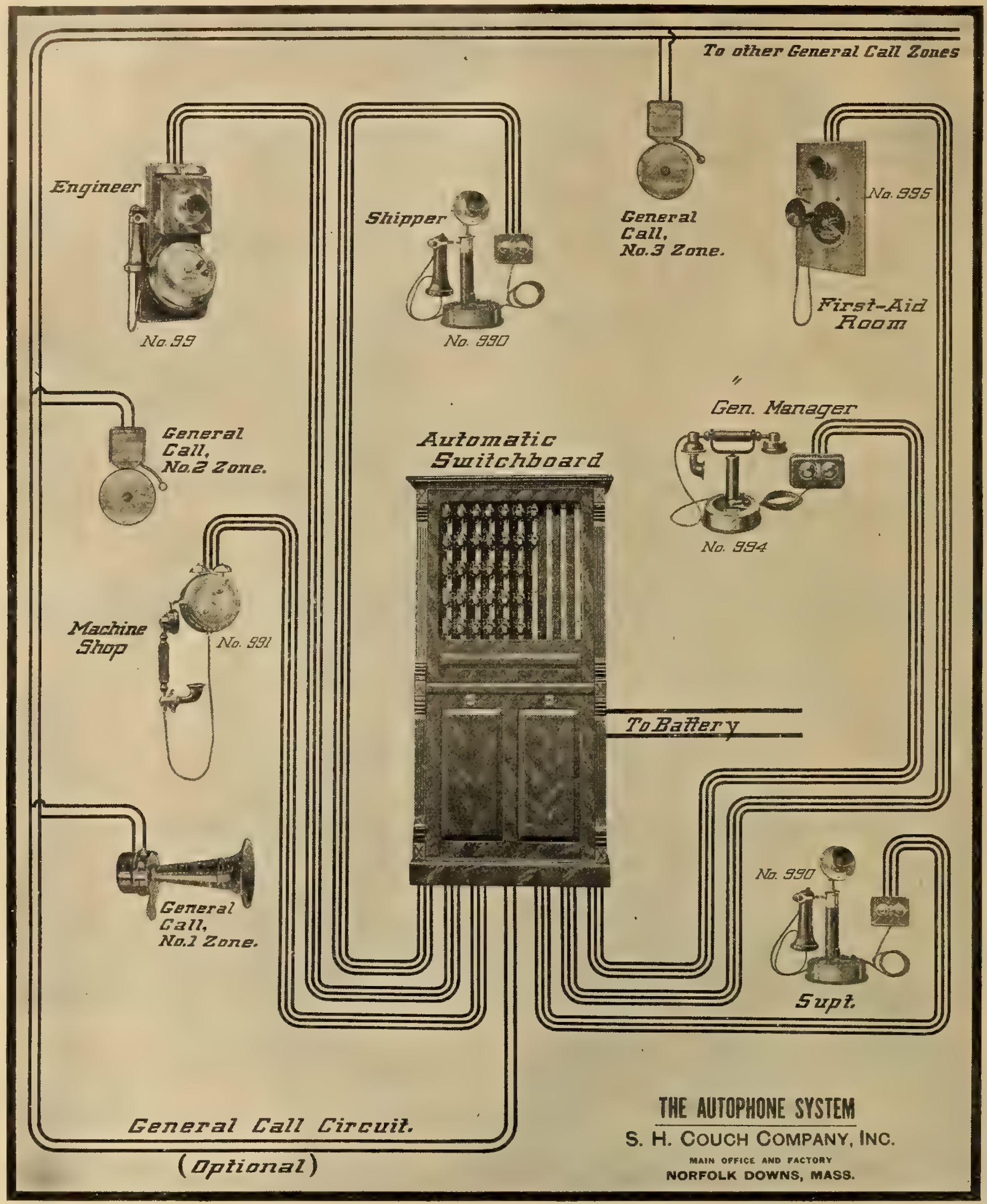

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Toronto & Hamilton Electric Co. 73
Toronto Radio Co. 25

United Mfg. & Distributing Co. 24

Ward Leonard Electric Co.
Walker & Sons, Hiram
Wagner Electric & Mfg. Co. 1
White Electric Co., T. C.

Rubber Covered Wires and Cables

FOR POWER, LIGHT AND TELEPHONE WORK

Incandescent Lamp Cord, Flexible Switchboard Cables, Special Cords and Cables for all kinds of Electrical Work.

Prompt Shipments from Canadian Factory.

BOSTON INSULATED WIRE & CABLE CO., Limited

Canadian Office and Factory, HAMILTON, ONT.

A Galvaduct Building

Warehouse at Turcot, adjacent to Montreal
Property of the Imperial Tobacco Co.
Electrical Contractors:—The Montreal Electric Co., Limited.

Galvaduct
Loricated

"GALVADUCT"

The most perfect interior construction conduit on the market.

Recognized as the standard of high quality.

"LORICATED"

A high-class interior construction conduit of the enameled type, proof against acid or other corrosive agents.

Always specify GALVADUCT or LORICATED CONDUITS

If your jobber cannot supply you—write us

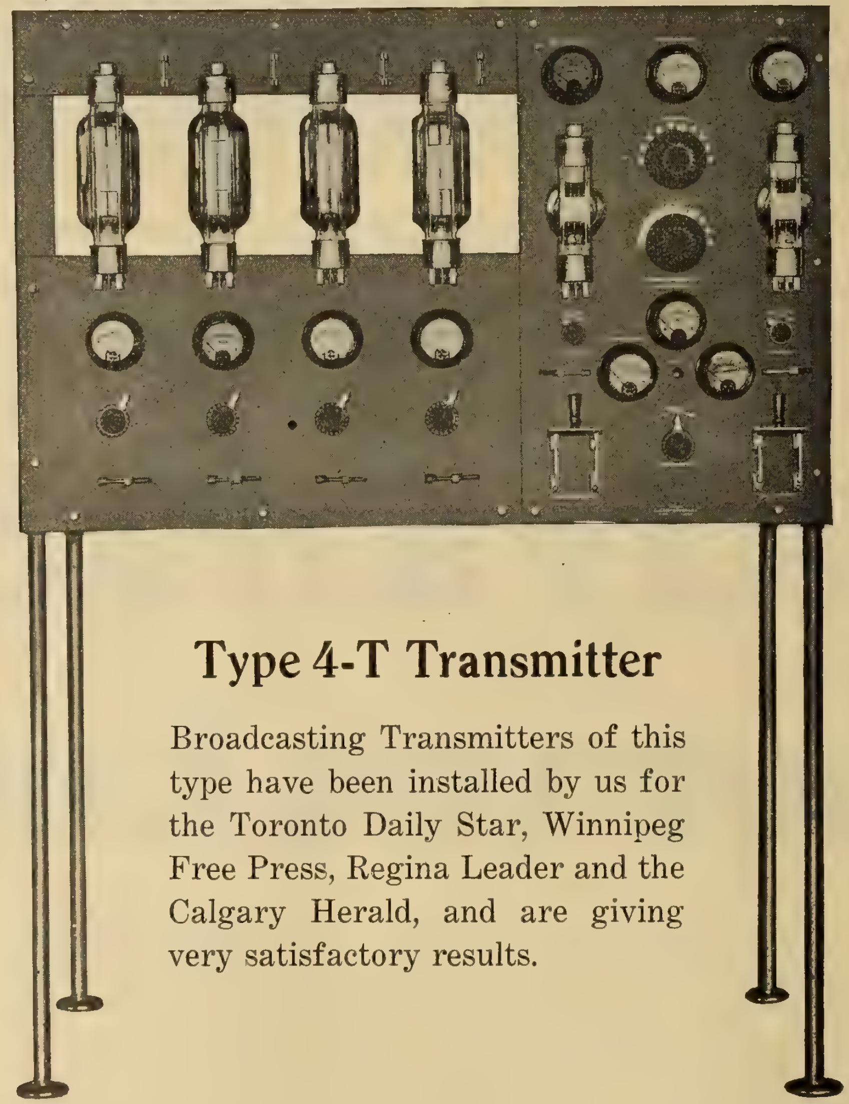
CONDUITS COMPANY LIMITED
TORONTO MONTREAL
Western Sales Office: 602 Avenue Building, Winnipeg

Standard Radio Equipment

(De Forest Patents)

We have developed a line of Radiophone Transmitters for commercial purposes and are prepared to carry out complete installations of this kind of equipment.

We are now equipping the two largest power systems in Ontario with transmitting sets. We solicit inquiries for apparatus of this kind.



Type 4-T Transmitter

Broadcasting Transmitters of this type have been installed by us for the Toronto Daily Star, Winnipeg Free Press, Regina Leader and the Calgary Herald, and are giving very satisfactory results.

Our Receiving Units ensure best results. Ask for our R 30 Bulletin.

Canadian Independent Telephone Co., Limited

Office: 212 King St. W.
Factory: Wallace Ave., Toronto

Western Distributors:

Radio Corporation of Winnipeg, Winnipeg, Man.
Radio Corporation of Regina, Regina, Sask.
Radio Corporation of Vancouver, Vancouver, B.C.
Radio Corporation of Calgary, Calgary, Alta.

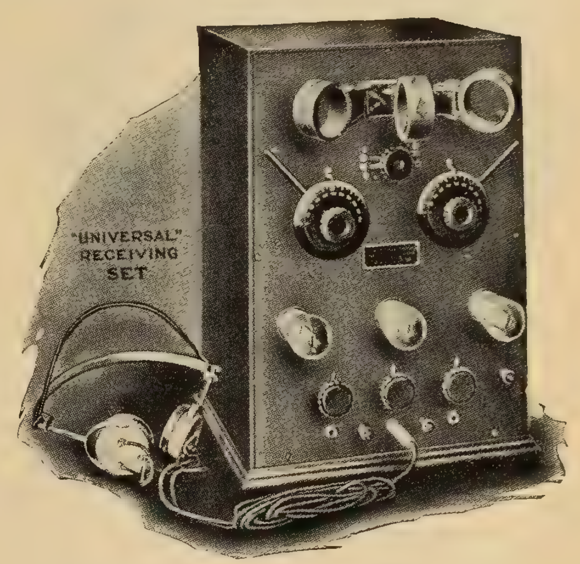
Standard Radio Equipment

(De Forest Patents)

Place Your Order Now

A reputation for manufacturing radio receiving sets that give greater efficiency than any other make is creating a demand for our sets that even with our increasing production will tax all our resources to keep up with it.

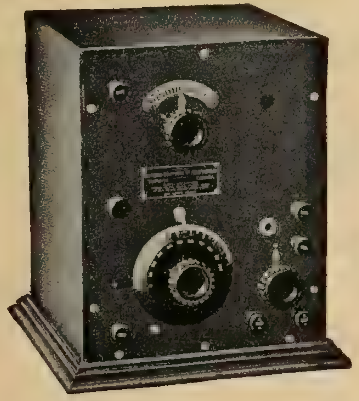
To own a radio set manufactured by us is to ensure the maximum enjoyment to be obtained from radio.



Universal Receiving Set

Our "UNIVERSAL" RECEIVING SET consists of the necessary tuning elements, a detector unit and two stages of Audio amplification, all assembled in a highly finished quarter-cut oak cabinet. The "B" batteries are also placed in the cabinet. This set will respond to wave lengths 180 and 20,000 meters. HONEYCOMB COILS are used for inductances, associated with high grade condensers having Vernier attachments.

Owners of these set are breaking long distance receiving records.



"SC-10" Radio Receiving Set

"SC-10" Radio Recieving Set

Our "SC-10" RADIO RECEIVING SET is a short wave length regenerative set designed for those who would rather purchase a single unit and add one of our type "S" two step Audio amplifiers later on. This set is very easy to operate and is far in advance of any similar set now being sold both as to appearance and results obtained.

We will be pleased to send you, on request, a copy of our R30 BULLETIN, which gives full information on our radio equipment.

CANADIAN INDEPENDENT TELEPHONE CO., LIMITED

OFFICES: 212 King Street, West FACTORY: Wallace Ave., TORONTO

WESTERN DISTRIBUTORS:

Radio Corporation of Winnipeg, Winnipeg, Man.
Radio Corporation of Vancouver, Vancouver, B.C.
Radio Corporation of Regina, Regina, Sask.
Radio Corporation of Calgary, Calgary, Alta.

Banfield Adjustable-Lite

The handy lamp with many uses. They are made of solid brass in three finishes Brushed Brass, Bronze and Nickle, very durable, handsome in appearance, stands 12 inches high, with 5 inch by 3 inch base which is made in the form of a clamp, felt lined so as it will clamp on highly polished furniture without scratching or marring the finish. The shade is 5¾ inch in diameter. A new type Levolier lever socket is used and an eight foot cord with plug is attached to every lamp. Secure your Christmas supply now, your favourite jobber has them.

Western Representatives:

Cochrane, Stephenenson & Co. Ltd.
Winnipeg - Vancouver

W. H. Banfield & Sons Ltd.

370-386 Pape Avenue - Toronto

THE L. and N. COMPANY Limited

TORONTO
Robert G. Ross
56 Carlton St.

ST. JOHNS, Que.

WINNIPEG
Fred. E. Garrett & Co.
501 Confederation Bldg.

MANUFACTURERS OF FLEXIBLE CONDUIT AND KRAFT PAPER CORD

LOOMDUCT

A Single Wall Conduit of Unusual Flexibility.

Every coil of "Loomduct" and "Insuladuct" is fished at the factory and guaranteed against defects of every kind.

INSULADUCT

A Double Wall Conduit of Great Strength and Durability.

TRADE MARK
Loomduct
REGISTERED

APPROVED BY THE BOARD OF FIRE UNDERWRITERS : :

TRADE MARK
Insuladuct
REGISTERED

THE FOLLOWING SIZES ALWAYS IN STOCK:—¼" ⅜" ½" ⅝" ¾" 1"

400 of Canada's most successful contractors, Use

Henderson Prices

SCATTERED throughout Canada from the Maritimes to the Pacific Coast, hundreds of electrical contractor-dealers are seeking new ways and means to improve and consolidate their position in the business world.

More trade and a saner margin of profit is what they are striving for.

They instal up-to-date store equipment with which to give greater service to their customers; they work night and day in an effort to roll up new records of gross turnover—then at the end of the year discover they are no further ahead than when they started.

They have overlooked that most important link in the merchandising chain—the method whereby the proper selling price is received.

The Henderson Price System

would solve this problem for them exactly as it is doing for the 400 and more dealers now using the service.

It would put their business on a really profitable basis. And at a cost of only ten cents a day.

Use the Order Form. Just Try it For One Year

ORIGINAL

ORDER FORM

ELECTRICAL
RESALE SERVICE

HENDERSON BUSINESS SERVICE, LIMITED
Box 123, Brantford, Ont.

Dear Sirs:— Date..................................

You may enter our order for your Electric Resale Price Service on the following terms and conditions:—

You are to furnish us with a loose-leaf Resale Price Book on Electrical Material as supplied to the Electrical Trade throughout Canada for which we agree to pay you the sum of $36.00. Payment to be made as follows:—$9.00 with this order and three payments of $9.00 each at the end of each 3 months' period following. If any payment becomes 30 days past due the total balance owing is immediately due and payable. We agree to remit the above payments by Money Order and failing to do this, will accept your sight drafts with exchange.

You are to keep this book revised for the next 12 months by sending us whatever Change Sheets are issued from your office.

At the expiration of this 12 months' period you may continue supplying us with the Change Sheets whenever issued, until we notify you 30 days in advance of our wish to discontinue. We Agree to pay you the sum of $3.00 a month for this Service by remitting Money Order each month and failing to do this, will accept your sight draft for $9.00 (with exchange) at the end of every 3 months.

It is distinctly understood that these are suggested Resale Prices and we are under no obligation or Agreement to maintain the prices compiled by you.

Accepted by: Signed ....

Street ....

.... City ....

"TRISTEEL"

Flexible Conduit

TYPICAL MOTOR INSTALLATIONS

For Economy Installations
Use
"TRISTEEL"

Sizes 5/16 to 2″ Carried in Stock

Selling Agents

Conduits Company Limited
Winnipeg - Toronto - Vancouver

The New

EUREKA

Grand Prize, Electric

VACUUM CLEANER

An Opportunity for Live Dealers to Make Tremendous Profits

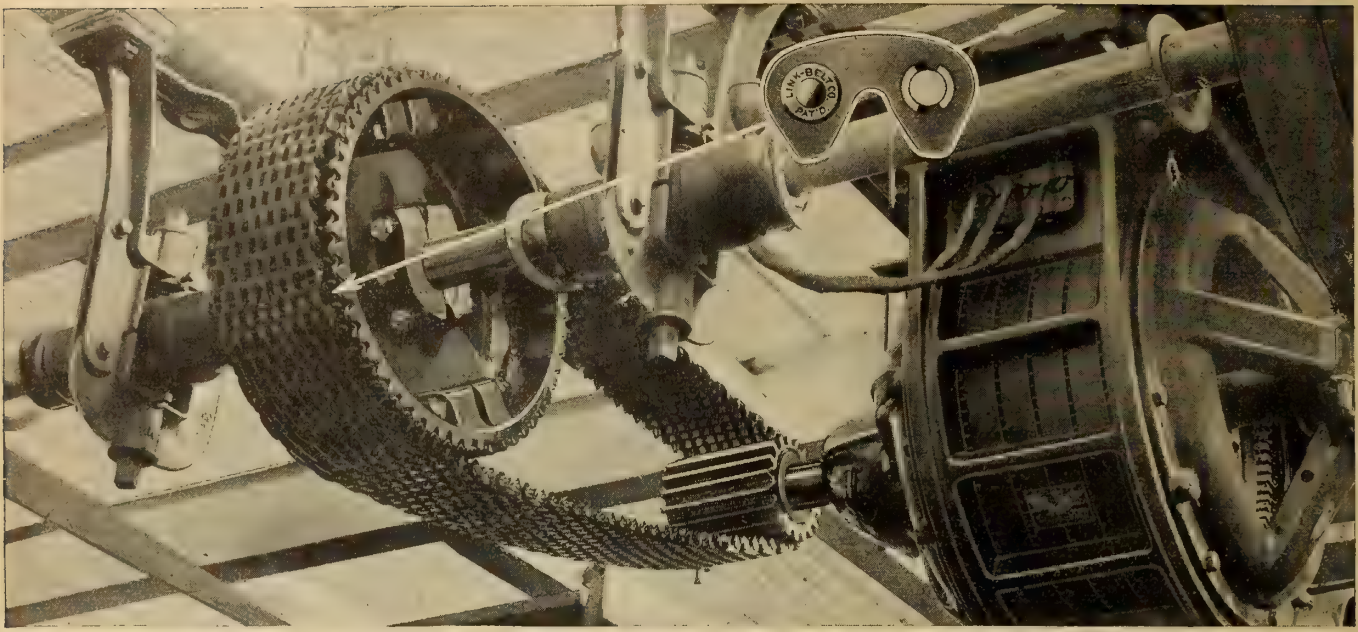
Seldom has an article of electrical equipment been put on the market that offers the dealer an opportunity for profits comparable to that presented by the new Eureka. It is so efficient, handsome and durable, that it recognizes no competition and the attractive price was all that was necessary to make its appeal irresistible. It is the culmination of 12 years intensive effort to produce a perfect vacuum cleaner.

Added to this—Eureka dealers are backed to the utmost by the manufacturers. They become a part of a sales organization which has become famous throughout Canada. Will you continue to neglect this opportunity for a big volume of business and rich profits? If not, then get in touch with us.

Don't Delay Another Day

Eureka Vacuum Cleaner Company

Kitchener, Ont.



HERE is the EFFICIENT drive for lineshafts and machinery of every character —in every line of industry.

It is 98.2% efficient (on actual test). It is flexible as a belt—positive as a gear—more efficient than either. Made in various sizes to transmit power from ¼ H. P. to 1,000 H. P. and over. Thousands of successful installations testify to its unrivaled success.

Link-Belt Silent Chain is practically a flexible gear. It cannot slip. Tension is on the pulling side of the chain only; hence journal friction is much less than with belt drives. No power is lost due to bearing friction; 98.2% of the energy of the motor is transmitted to your shaft or machine to perform useful work. This means increased production.

The drive is not affected by atmospheric conditions, operating equally in hot, cold or damp places; it permits economy of space because you are able to arrange for centers to suit the convenient location of your driving unit. It combines in one drive the best points of leather belts and cut gears, minus their disadvantages. You should use Link-Belt Silent Chain on all important drives in your plant.

Look at the illustration, think over these statements and then send for one of our experienced Power Transmission Engineers to study your conditions. He will explain the results of various tests which have proved the superiority of the Link-Belt Silent Chain Drive. This service we render without obligation.

Link-Belt Silent Chain is the EFFICIENT means of transmitting power, and we welcome the opportunity of proving it to you in your own plant, under your individual conditions. We sell each drive complete and guarantee its successful operation.

Send for 128-page Link-Belt Silent Chain Price List Data Book No. 125. It completely illustrates and describes the drive.

CANADIAN LINK-BELT COMPANY LTD.

TORONTO, WELLINGTON & PETER STS.
MONTREAL, 10 GAUVIN LANE

LINK-BELT

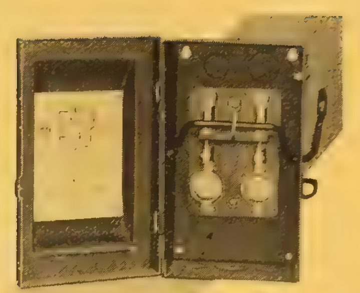
SILENT CHAIN DRIVES

C. G. E.
Service Boxes

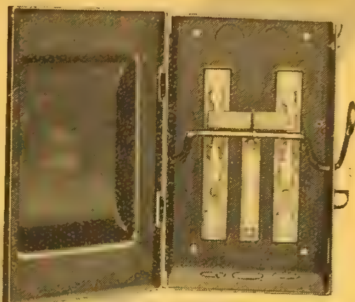
The new line of C.G.E. Steel Service Boxes consists of 30 Amp. 125 Volt, House Service type, Cat. No. C.G.E. 100A, made in three capacities, 30, 60, 100 Amp. 125/250 Volt, triple pole, Solid Neutral Boxes—externally operated.

To Create Prestige

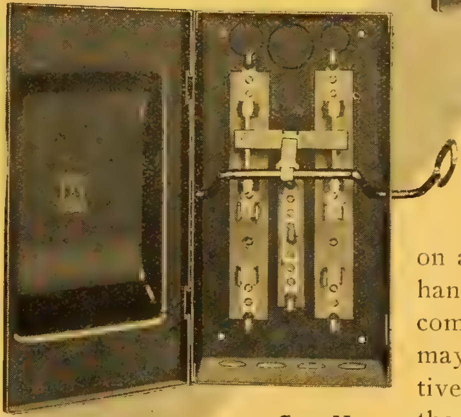
Use C.G.E. Wiring Devices throughout. No better guarantee of a satisfactory job can be given, than to state that C.G.E. material has been used exclusively.



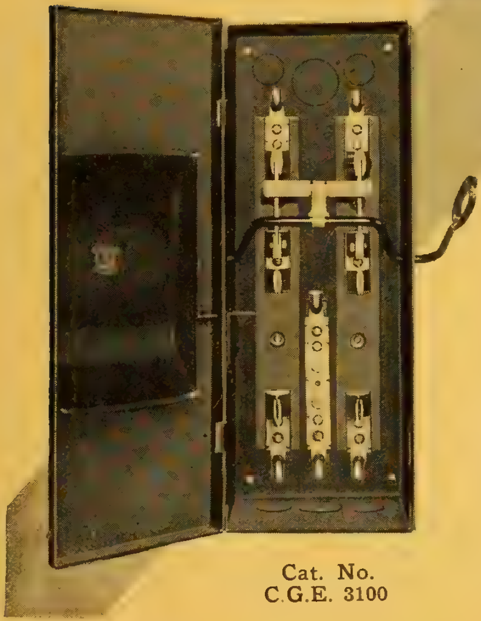
Cat. No.
C.G.E. 100



Cat. No.
C.G.E. 3030



Cat. No.
C.G.E. 3060



Cat. No.
C.G.E. 3100

Cat. No. C.G.E. 100A is a double pole box, switch fused with 125 volt Plug Fuses at the hinge-end, mounted on a Porcelain base. The externally operated handle is so arranged that by use of a small commercial padlock or sealing wire, the box may be locked closed, with the switch operative for Supply Companies Active Service; or the box may be locked closed with the switch locked open for Discontinuance of Service. With the box open the switch may be locked open for Wireman's protection when working on the circuit. The steel box is entirely die made, and consequently has a neat and pleasing appearance. It is completely equipped with grounding terminal, suitably placed ½" to ¾" knockouts, and wiring diagram showing proper and approved method of installation.

Externally Operated

Cat. Nos. C.G.E. 3030, 3060, and 3100, 30A, 60A, 100A. T. P. 125/250V. Service Boxes are designed with separate units for each pole of the switch, and the metal parts are made removable for replacement of burned clips, etc. The centre or neutral poles are equipped with terminal lugs for a solid neutral connection with removable plate for meter testing. Knockouts are suitably placed, and ample wiring space allowed within the boxes. The Switches can be locked open with the boxes closed by means of stops and latches for padlocks. These three service switches can be readily converted into double pole 250 volt devices if desired.

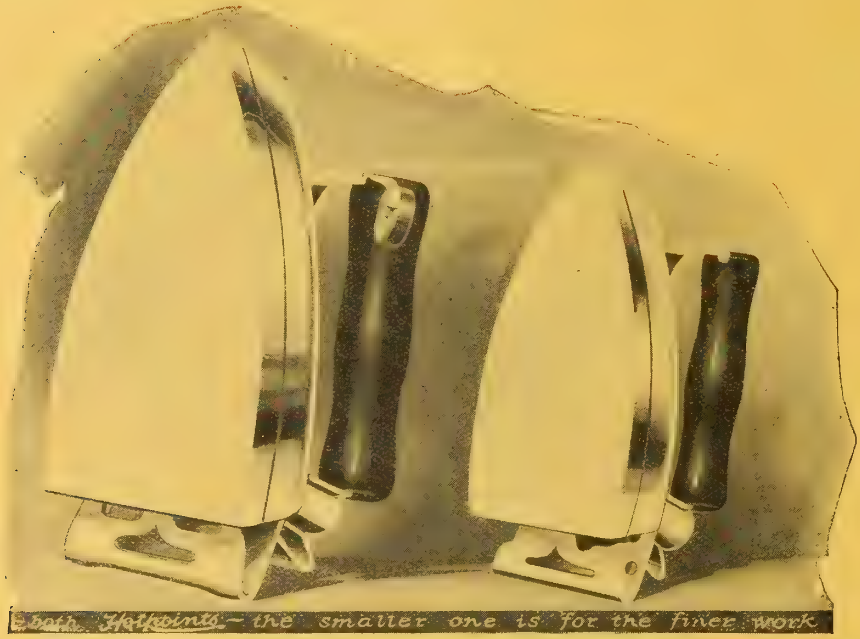
"Made in Canada" by

Canadian General Electric Co., Limited

HEAD OFFICE TORONTO

Branch Offices: Halifax, Sydney, St. John, Montreal, Quebec, Cobalt, Ottawa, Hamilton, London, Windsor, South Porcupine, Winnipeg, Calgary, Edmonton, Vancouver, Nelson and Victoria.

Hotpoint



Both Hotpoints — the smaller one is for the finer work

A Few Reasons Why It Pays You To Standardize On This Famous Iron

1—The Hotpoint Iron is the standard by which all other electric irons are judged.

2—There are over a quarter of a million satisfied users in Canada.

3—It is nationally advertised.

4—It will create prestige for you among your customers.

5—Once sold it stays sold.

6—It allows you a good margin of profit with a much quicker turnover than any other iron on the market.

"Made in Canada" by

Canadian General Electric Co., Limited

HEAD OFFICE TORONTO

Branch Offices: Halifax, Sydney, St. John, Montreal, Quebec, Cobalt, Ottawa, Hamilton, London, Windsor, South Porcupine, Winnipeg, Calgary, Edmonton, Vancouver, Nelson and Victoria.

Hotpoint

Hotpoint
BOUDOIR SET
A Dainty Serviceable Gift
Canadian General Electric Co. Limited

This Year Say "Merry Christmas" Electrically
Give—
Hotpoint
Servants for the Home

Hotpoint
PERCOLATOR
The Gift of Charm and Utility
Canadian General Electric Co. Limited

Hotpoint
The Gift of Gifts
Canadian General Electric Co., Limited

Over One Million People Will See These Christmas Advertisements

HOTPOINT Christmas Advertisements will appear in over forty daily newspapers from Halifax to Vancouver. The combined circulation of these papers is considerably over one million copies.

Assuming that only one person sees each advertisement, the number of potential customers reached will be enormous.

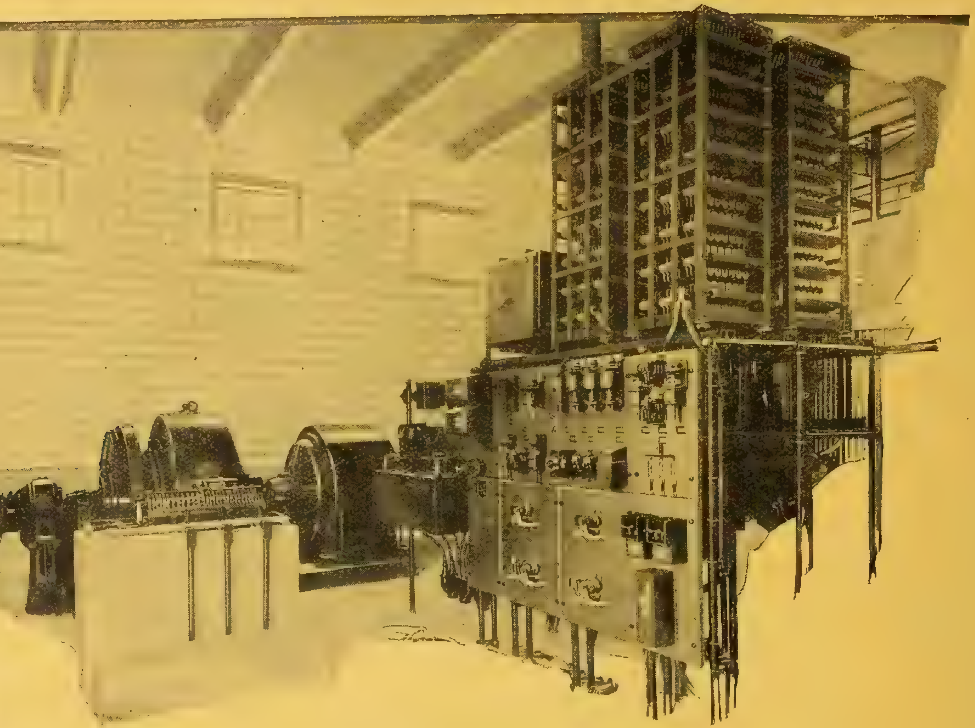
Are you in a position to take care of the demand for "Hotpoint Servants for the Home" in your neighborhood? Your jobber or our nearest sales branch can supply you.

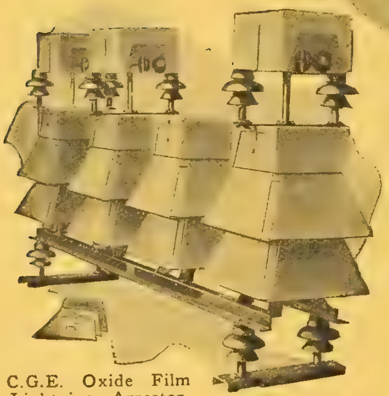
Canadian General Electric Co., Limited

HEAD OFFICE TORONTO

Branch Offices: Halifax, Sydney, St. John, Montreal, Quebec, Cobalt, Ottawa, Hamilton, London, Windsor, South Porcupine, Winnipeg, Calgary, Edmonton, Vancouver, Nelson and Victoria.

Save Money and Improve Service





C.G.E. Oxide Film Lightning Arrestor

C.G.E. Type H Transformer
"The Standard Quality"

C-G-E Automatic Substations Produce Results

Automatic Railway Substations start up and shut down as the demand for power appears or disappears. The expense for operators is eliminated so that cost for attendance is minimized.

Automatic Substations can be more closely spaced because of the lower cost of operation. This saves feeder copper and improves the trolley voltage. By shutting down under no load "running light losses" are saved for a large part of the day.

Let the automatic station engineer in the nearest C.G.E. office tell you how much your savings would be with C.G.E. automatic control.

Canadian General Electric Co., Limited

HEAD OFFICE TORONTO

Branch Offices: Halifax, Sydney, St. John, Montreal, Quebec, Cobalt, Ottawa, Hamilton, London, Windsor, South Porcupine, Winnipeg, Calgary, Edmonton, Vancouver, Nelson and Victoria.

1048

Write for our
catalogue of
ELECTRICAL
TABLE LAMPS

Immediate delivery
at popular prices
F.O.B, Toronto

11

Special in Imported Electric Shades
Four Patterns No. 1048-11-21-9

Packed twenty four dozen to case	**Per Doz. $1.35**
Less than case lots " " "	**Per Doz. $1.60**

Czechko-Slovakian make

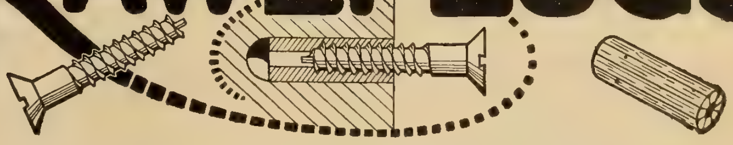
(No charge for original cases)

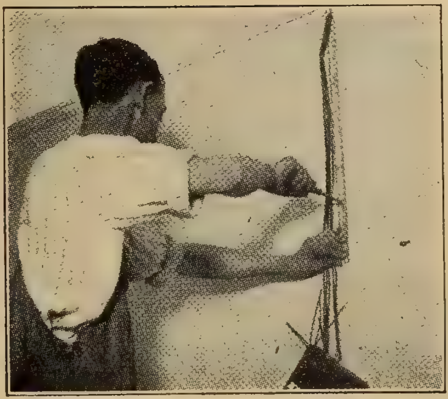
LYONS & MARKS

38 Yonge Street Toronto, Ont. Phone Main 3387

FIX IT WITH

RAWLPLUGS





You can fasten a fixture, wire, cable, pipe, bracket (or anything that is held by a screw) with the aid of Rawlplugs, and then forget about it. It will not work loose because the screw is held in a vice-like grip and all vibration is absorbed by the Rawlplug.

Using Rawlplugs is equivalent to tapping every hole made, as a perfect thread is formed when the screw is being turned home.

Used successfully in every kind of material— brick, plaster, concrete, glass, slate, tile, hard rubber, marble, etc.

INVENTIONS LIMITED

Sole Agents for the Rawlplug Co. of Canada

Southam Building Bleury Street Montreal

Sales Agents for Ontario: Dominion Engineering Agency, Limited, 24 Adelaide St., East, Toronto.

Sales Agents for Manitoba: Sterling Specilties, 213 Somerset Building, Winnipeg, Man.

The Electrical Dealers' Opportunity

RADIO

Equipment For Profitable Sales

RADIO HEAD PHONES

World's Largest Distributors of

Radio Head Pieces

We represent 30 manufacturers, showing 75 types and designs, priced from $5.00 to $15.00. Following is a partial list of manufacturers:

Manhattan	**Dictagraph**
Frost-Fones	**Corey**
Connecticut	**Everett**
Leich	**Elwood**

Thompson-Levering
Western Electric
American Electric
Holtzer-Cabot

Phones on hand for immediate shipment. Ask us for the phone you want. Special—100-ohm single receivers made by old reliable telephone maker. List—$2.50. Agents Wanted Everywhere. Get literature and discount sheet.

B. E. POLCZYNSKI & CO.
169 Capitol Bldg. - 1550 Broadway
Detroit, Michigan, U.S.A.

-Just Good Equipment-

GENERATORS—D.C. 125-250 volts

1-2-3-5-7½-10 Kw standard makes rheostats and pulleys.

A.C. 60 cycle

15-30-50-75-100-300 Kw pulleys, bases and rheostats.

MOTORS— A.C. 60 cycle 3 phase

3-5-7½-10-20-30 H.P. and upwards all complete.
All sizes of repulsion type single phase motors.

A.C. 25 cycle 3 phase

1-2-3-5-7½-10-25-30-40-50 H.P. and upwards all complete.
All sizes of single phase motors, repulsion type only.

SEE—RADIO—SUPPLIES

YES—We can supply you with that receiving set you want. OR get that loose-coupler, tuning coil, condenser, insulator, grounder, battery, detector, wire, variometer FROM US.

ASK US QUESTIONS ABOUT YOUR SET OR WHAT YOU WILL INSTALL.

Industrial Engineering Company of Canada, Limited
Consulting Engineers—Electrical Equipment
R. G. Lee, General Manager
TORONTO OFFICE: 28 Wellington St. W., Carlaw Bldg.

NO STORAGE BATTERY

We carry a line of Radio Receiving Sets using the new types of

VACUUM TUBES

which operate on standard dry cells. No storage battery required.

With these sets the following radio stations have been heard in Montreal:

New York, Newark, Detroit, Chicago, Louisville Kentucky, Kansas City, etc.

BROCK RADIO Co.
B. L. SILVER RADIO ENG.
357 St. CATHERINE St. W. MONTREAL. PHONE-UP.6861

It PAYS To Sell

"United" Radio Products

They look right, and they are right. Materials, workmanship and finish reflect the years of engineering and manufacturing experience back of them.

"United" Variable Condenser with Vernier

The only Vernier with stop

46 plate	$6.50
26 plate	5.50

"United" Non-Vernier Condensers

43 plate	$4.50	5 plate	$2.75
23 plate	4.00	3 plate	2.25
11 plate	3.50	without dial or knob	

"United" Audio Frequency Amplifying Transformers

Pat. Applied for

magnetically shielded as shown, in a shell of original design.
Ratio 5 - 1.
Gives loud, clear signals.
Fully mounted as shown $4.50.

JOBBERS and DEALERS, send for Circular and Discounts

UNITED MFG. & DISTRIBUTING CO.
CHICAGO 536 Lake Shore Drive ILLINOIS

QUALITY RADIO SUPPLIES

Listed below are a few of the many lines we stock:

MURDOCK
FROST
FEDERAL
BROWN
MAGNAVOX

MULLARD
CHELSEA
U.S. TOOL
NORTHERN ELEC.
ELECTROPLAX

Send for New Price List of Sept. 15th

TORONTO RADIO COMPANY
Wholesale Only **147 Victoria St. Toronto, Ont.**

MOTORS

TRANSFORMERS, COILS

Used Motors for Sale

Write for our price list

COILS FOR ALL MAKES OF MOTORS

Repairs on Electrical Apparatus
Our Specialty

Canadian Armature Works
St. Catharines, Ontario

Looking Ahead

Owing to the increased volume of business we have secured larger premises at

29 Duke Street, Toronto

On and after October 15th, 1922, we will be in a position to meet your demands for High Grade Radio Parts.

Tomlinson & Forbes
216 Victoria St., Toronto

Why "Chi-Rad" dealers are successful

DISTRIBUTORS FOR
Am. Radio & Research Corp.
DeForest Radio Tel. & Tel. Co.
Acme Apparatus Co.
Adams-Morgan Co.
C. Brandes, Inc.
Burgess Battery Co.
Clapp-Eastham Co.
Elec. Research Laboratories
Federal Tel. & Tel. Co.
General Radio Co.
Wm. J. Murdock Co.
Wireless Press, Inc.
Chelsea Radio Co.
A. H. Grebe & Co.
Rauland Mfg. Co.
Thordarson Elec. Mfg. Co.
Remler Radio Mfg. Co.
Gilfillan Bros.
Pacent Electric Co.
Mu-Rad Laboratories, Inc.

Because every radio part from "Chi-Rad" not only offers a liberal profit to the dealer but complete satisfaction to the customer.

We can give you prompt delivery and service on any parts from the manufacturers listed here.

Write for free catalog.

Our 1923 loose-leaf catalog with radio parts from all the manufacturers listed above is yours for the asking—see coupon.

Chicago Radio Apparatus Co.
415 S. Dearborn St. CHICAGO

Gentlemen:—Please send me free copy of catalog and dealers' discount sheet.

Name ....
Address ....

Interior Telephones

for

Apartment House, Factory, School, Hospital, Office

Electric Reset Annunciators and Signal Specialties

Hospital Signal System

A complete new silent call system for hospitals. Registers at nurses' quarters and office with time record, if wanted.

Canadian Factory Representatives:

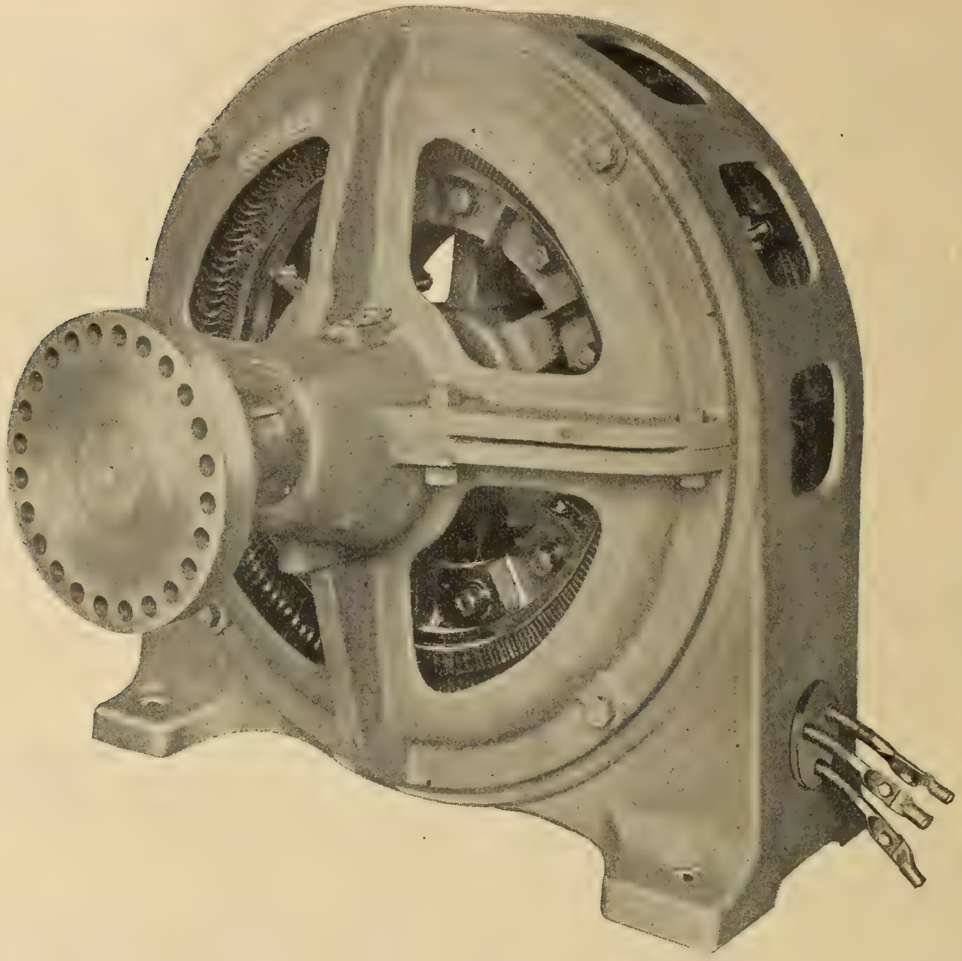
COCHRANE, STEPHENSON & CO. Ltd.
265 Portage Avenue
Winnipeg, Manitoba

COCHRANE, STEPHENSON & CO. Ltd.
608 Pacific Building
Vancouver, B. C.

TIMBERLAKE & BOURNE
New Birks Building
Montreal, Quebec

THE PIERCE ELECTRIC COMPANY
39 Richmond St., East
Toronto, Ontario

CONNECTICUT TELEPHONE & ELECTRIC COMPANY
MERIDEN, CONNECTICUT



Un-ordinary Motor Services

Canadian Crocker-Wheeler engineers take keen interest in the economical solution of the un-ordinary power problem. The above motor is an interesting development of a wound rotor variable speed motor, 300 h.p., 600 r.p.m., 2200 volts, 3 phase, 60 cycles, for operating a mine hoist.

THE CANADIAN
CROCKER-WHEELER CO.
LIMITED

Manufacturers and Electrical Engineers

Head Office and Works:
ST. CATHARINES, Ont.

District Offices:
TORONTO MONTREAL

Also all
Branches of
Northern Electric Company
LIMITED
Montreal, Halifax, Ottawa,
Toronto, London, Winnipeg,
Regina, Calgary, Vancouver.

IN the humid, lint laden atmosphere of the textile mill R & M motors operate with that unfailing reliability they show in all other industrial plants. Their thoroughly moisture-proofed windings, oversize, dust-proof bearings, heavy frames, and low temperature ratings, provide a margin of safety which insures long life and dependability in every class of industry, whether service conditions are normal or severe.

Because of their absolute reliability and low maintenance cost, users who have tried R & M motors almost always express a preference for them when buying additional motors. And for this reason, contractors, motor dealers and jobbers find maximum profit in the R & M line.

The Robbins & Myers Company of Canada, Limited

Brantford - Ontario

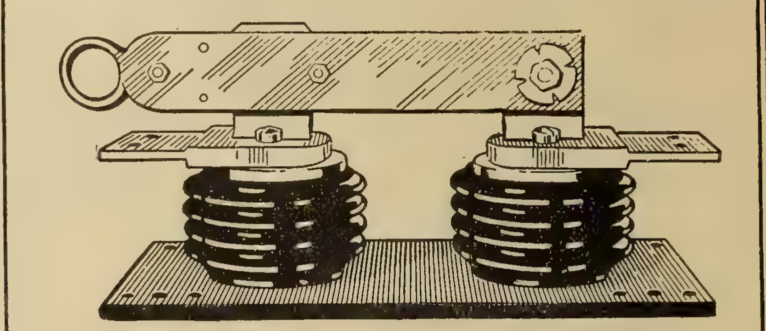
Robbins & Myers Motors

High Tension Securities

Indoor Disconnects that safely carry overloads without excessive heating

We also build the following equipment:

- Indoor Bus Supports
- Indoor Disconnecting Switches
- Indoor Switchboard and Structural Fittings
- Outdoor Disconnecting Switches
- Choke Coils
- Copper Fittings
- Outdoor Substations



Elpeco Indoor
Disconnecting Switch

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Electrical News
Generation, Transmission and Application of Electricity

For nearly thirty years the recognized journal for the Electrical Interests of Canada

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Progress Toward a Uniform Standard of Electrical Specifications

The Legislative Assembly of the Province of British Columbia has passed an Act to "Provide for the Inspection and Regulation of Premises and Equipment for the Generation, Transmission, Supply or Use of Electric Energy." In a general way the conditions under which these inspections will be carried out are very similar to those which obtain in the Province of Ontario. A staff of inspectors will be appointed, over which a chief inspector will preside, and any inspector has the power, at any time, to enter any premises where any electrical equipment is being used, to inspect and examine this equipment, and if necessary, to require that its use be discontinued. According to the act the inspector may examine plans and specifications of electrical equipment to be installed, though it does not appear that this authority is intended to include the installation of wiring.

One of the difficulties in the Province of British Columbia, as in a number of other provinces in the Dominion, has been the possibility of importing equipment that does not meet the requirements of such bodies as the Underwriters' Association, or the Hydro-electric Power Commission of Ontario. While there has been a moral influence exerted to keep equipment that does not come up to standard out of the country, this influence in the past has not been sufficient and as a result much material that is decidedly below standard has been introduced, in spite of the protests of those who have the interests of the electrical industry most at heart. An example of this was an electrical iron, which we recently mentioned as having been introduced into the Province of Quebec, and which did not meet the requirements of the Underwriters' Association. The industry in that province was practically helpless, because there was no law to prevent the importation and distribution of this equipment. The B. C. Act would seem to take care of this matter, however, in that province, for it says, "where any electrical equipment installed in any premises is deemed, by the inspector, to be dangerous, to person or property, he notifies the owner of these premises to discontinue its use." In addition to this, where the inspector is of the opinion that electric equipment of any specific manufacture is so dangerous, to person or property, that it ought not to be permitted within the province, he may give notice directly to the manufacturer, or through the Gazette, that no person shall, within the province, sell any electrical equipment of that manufacture.

British Columbia by this Act is moving in the right direction, and we hope it is only a matter of a short time before all the provinces can agree on some uniform plan for regulating not only the wiring installations in our homes, but also arrange a standard by which all household equipment must be judged—as well as other electrical equipment. As mentioned elsewhere in this issue the Canadian Engineering Standards' Association is working to the end that a conference be held in Ottawa, at which representatives from all provinces should be present, with a view to giving Dominion wide recognition to some set of standards that may be determined. It may be that the Underwriters' Laboratories' Standards would not meet with uniform approval. Possibly also the rules and regulations of the Ontario Hydro Commission may be subject to certain criticisms in the other provinces. These are matters, however, for discussion, and surely a compromise could be reached.

In discussing this question we must not lose sight of the fact that these are times when industrial economies are absolutely essential. Anything therefore that tends to reduce the cost of construction, and the expense of carrying on, should be considered. If the manufacturer finds it necessary to make equipment to one specification in Ontario and to another specification in, say, Alberta, this condition adds to the cost to the consumer in both provinces. However, it does not add anything to the protection of the citizen, as the requirements have been specified by different groups of men, equally well advised on the problem and equally anxious to protect the public. It is simply a matter of not getting together.

We consider the proposed convention in Ottawa a very important move. It would probably not be difficult to convince such a convention of the necessity for standardization. The next step would be a convention of electrical men to decide among themselves, definitely, just what the requirements to be specified should be.

The Legal Responsibility of Electrical Workers

A case that was recently decided in the Superior Court, in Montreal settled an important point in regard to the legal responsibility incurred by electrical contractors or other electrical firms undertaking repair work.

The stated facts of the case were that an electrician was called to do some repairs to the elevator of the Crescent Turkish Bath Company. The electrician arrived, and instructed the engineer of the company to rotate the elevator motor by hand. This was done, by means of a pipe wrench put on the axle of the motor.

The electrician then asked the elevator boy to try to take the elevator up. The engineer here intervened and said that it could not be done, but that he could start the elvator from the switchboard. He was instructed to do so by the electrician. On turning on the power, the pipe wrench which had been left on the axle of the motor, flew off striking the electrician and breaking his arm.

Action was taken by the electrician against the Crescent Turkish Bath Company, under the common law, and was for the amount of $2,000 damages.

The court held not only that the essential allegation of fault had not been proved by the plaintiff but as the plaintiff had been sent as an electrician for the purpose of repairing the elevator, and as the work of repairing was under his control, he was to be considered in charge of the permanent employees. Consequently it was his duty to exercise such a supervision over the operations as to prevent accident, which the judge said, he had not done, and so he was himself to blame for the damage suffered. The action was dismissed.

The finding would appear to establish the fact that where an outside firm send an electrician to do repair work the electrician is deemed to be in charge of the repair work and responsible that due care is taken in its execution. If he suffers damage by reason of the fact that he has not taken such care, he can not recover. There are many other contingencies suggested, arising from the above, and the only way to guard against trouble of this kind would appear to be for the management of electrical firms to make sure that their outside men thoroughly understand their responsibilities.

Can not Electric Store Fronts "Stand Out"?

A point brought out by one of the speakers at the recent convention of the Ontario Association of Electrical Contractors and Dealers was the fact that it is difficult to recognize an electrical store. He stated that he travelled over all the business section of a certain city, looking for electrical stores and passed by many of them for the reason that these stores seemed inconspicuous.

It is not difficult to say why these stores seemed inconspicuous; some of the reasons are inherent to electrical merchandise, others are simply due to poor performance on the part of the dealer.

As one of the inherent reasons we would say that the electrical line is so varied, there is no one thing used for window display that sticks out prominently. Another is the fact that the goods are handled by different kinds of stores. But aside from these reasons no one can mistake an electric store that carries a bright electric, sign, nor can he pass a window unnoticed that is remarkable for the beauty of its lighting.

The writer has received sundry jolts from the signs that shoe repair men stick up. Every once in a while he sees a sign "Electric Shoe Repairing" and it is sometimes accompanied by the representation of a forked bolt of lighting. Of course, that kind of a sign would not do for an electric store, but the point is, the shoe repair man thinks enough of the electric end of his business to advertise it, and the lightning bolt is conspicuous.

A store front that tells the passer-by what is sold therein in no mistaken terms, means better business.

Radio Acquiring a Firm Foundation

The broadening and improvement of radio programmes is a hopeful sign of healthy growth. Church services are included in the latest broadcasting schedules, and the fact that such an innovation fills a real need, extending the privilege of worship to thousands, speaks well for the future of radio.

Those who are most enthusiastic about the change are many of them aged people, too feeble longer to go to their churches, but anxious in their desire for spiritual uplift. Others are invalids, condemned to spend their lives in a single room. In many country districts, the churches are remote; in one case it is known that a little group of neighboring farmers gathered at the home of one of their members, who had a powerful receiving set with loud speaker, and listened in, making the responses and joining in the congregational singing.

There are other things that radio does that can be effected in no other way—let us hope that it may win to the point where broadcasting will be recognized by the people as a necessity of the same class as the postal service.

Canadian Engineering Standards Association

The semi-annual meeting of the main committee of the Canadian Engineering Standards Association, was held November 13 in Ottawa. Mr. H. H. Vaughan in the chair. After the transaction of formal business, the secretary reported that the membership of the association as of October 1st was 285, all members taking part in the work of various active committees of the association. Progress reports of the various working committees were presented, and it was announced that the specifications for steel highway bridges, incandescent lamps, watthour meters, wood poles for transmission lines, flexible wire rope and strand for aircraft, and commercial bar steel are well advanced or are ready for publication, that for steel bridges being in the press. The specification for flexible wire rope and strand for aircraft was approved for publication.

It was decided to take action in connection with a request for the Association's co-operation in connection with specifications for electric overhead crossings, the organizations interested in this case being the board of Railway Commissioners, the steam and electric railway authorities, the power companies, and various power commissions, the provincial governments, and the various telegraph and telephone companies.

The secretary reported that a number of favorable and some unfavorable replies had been received to the invitation sent out by Hon. Mr. Robb, Minister of Trade and Commerce, for an interprovincial conference to be held under the auspices of the association regarding the possibility of obtaining Dominion-wide agreement as to the requirements for the design, inspection and installation of electric fittings, appliances and equipment, and it was hoped that the conference in question would shortly be held.

According to a well-known botanist, seaweed contains a large amount of alcohol. This looks as if the bed of the sea within the three mile limit in America will have to be thoroughly overhauled.—Punch

The Application of Electricity in the Manufacturing Industry--11

Metal-Cutting Machine Tools Largely Motor-Driven —Variations in the Type of Drive Required—Methods of Speed Changing—Special Adaptations for Planer Use

Electric motors are in very extensive use for driving machine tools. The recognition of their advantages for this purpose has not been delayed, and in districts where electric power is available it is unusual to find any other type of power.

Standardization of motors is a feature, welcomed by manufacturers and consumers alike, that has had its part in advancing the use of electric drive. There are many advantages to be gained from this, notably in the reduction of manufacturing costs and delivery periods, and in the satisfaction of the user.

It may be pointed out, however, that there is room for improvement in the substitution of individual for group drive. This condition is gradually being remedied, due greatly to the co-operation of motor manufacturers. At the present time there are being manufactured motors that will take care of any machine tool service, and the result is that many machine tools are sold with the motor an integral part of the machine. This of course, helps the general adoption of individual drive.

There are certain cases where group driving serves the purpose of highest economy but for tools requiring approximately 5 h.p. or above the individual motor drive has an overwhelming advantage, owing, among other things to the reduction of total power required, to the improved illumination obtainable in the shops, to the greater flexibility in locating machinery, and finally, what is of vital importance, the increase in output per unit machine.

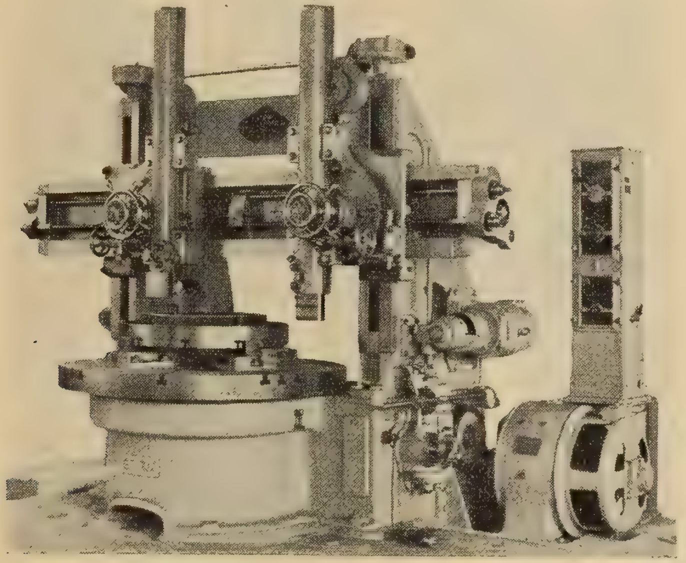
There are variations in the type of drive required. The following list enumerates the main classes:—

1. Constant speed main drives.
2. Variable speed main drives.
3. Constant speed auxiliary drives.

When Constant Speeds are Used

The constant speed main drive is the case of a constant speed motor, where all changes of spindle speed and feed are effected by mechanical means, such as gears or special pulleys.

In Canada it is uncommon to find direct current used for this purpose, but its use is quite prevalent in England. Either shunt or compound-wound motors are used. The shunt motor will suit the majority of cases, but where the machine tool possesses a large flywheel effect the compound-wound motor is preferable, as the speed variation with alteration of load is greater than the shunt-wound motor. This enables the flywheel effect to be utilized more efficiently for overcoming sudden and peaky loads. It is also advisable to adopt a compound-wound motor in all cases where a heavy starting effort is required.


A boring mill developed in England. Traversing, etc., by separate motor.
Photograph courtesy Alfred Herbert, Limited

Where alternating current is used, as obtains in the great majority of installations, the well-known squirrel-cage and slip-ring motors are the types used. There are many questions to be considered before either type is finally adopted.

Starting Conditions

The squirrel cage motor, is, of course, the simplest motor constructed. The only wearing parts are the bearings, the rotor is practically indestructible, no brushgear is necessary and the risk of breakdown is minimized. In general, however, a squirrel-cage motor of the highest efficiency will exert a starting torque of only ½ to 2/3 full-load torque with a starting current of from 1½ to twice full load current. On the other hand, a slip-ring rotor type motor is capable of starting against full-load torque with full-load current, or, if necessary, twice full-load torque with approximately twice full-load current. It is self-evident that a squirrel-cage motor cannot be used for the drive of machine tools requiring a heavy starting effort, unless some form of clutch is fitted to enable the motor to start light.

The heavy starting currents required by squirrel-cage motors are another factor that must be considered. Again, although automatic control can be used with squirrel-cage motors, such starting equipment is expensive and it is generally preferable to install a slip-ring rotor type motor when this type of control is required.

To sum up, therefore,—although no hard and fast rule can be laid down the use of squirrel-cage motors is recommended for the drive of machine tools requiring up to 20 h.p. where hand-operated control is desired, and slip-ring rotor type motors in all other cases.

Characteristics of Variable Speed Drive

Many manufacturers are putting direct current variable speed motors on the market. One firm makes these available for speed ranges of 4:1 and 3:1 and 2:1. Other firms have also standardized on this class of service.

The consideration of first cost also enters the question. A variable speed motor costs more than the equivalent constant motor which would be used for the same machine tool. The extra cost when taken as a percentage of the complete cost of the machine-tool equipment would, however, be small. The speed range obtainable on the motor itself enables the machine-tool maker to dispense with a gear box altogether in some instances, and reduce the number of gear ratios in others. The wearing parts of the machine tool are therefore reduced. In addition, very fine speed increments over a wide range can be obtained, as against the definite number of fixed speeds obtained with mechanical change gear. A variable speed motor geared direct to the machine tool, enables the highest economical cutting speed to be easily and quickly found by the operator. The increased output resulting from the delicate speed control is claimed to very soon counterbalance the increased initial cost.

Requirements of Constant Speed Auxiliary Drives

This type of drive is required for operating the quick traverse motion of tool slides, tailstocks and saddles, in cases where it is preferable to use a separate motor for the duty, and the motor only operates at its normal load for short periods.

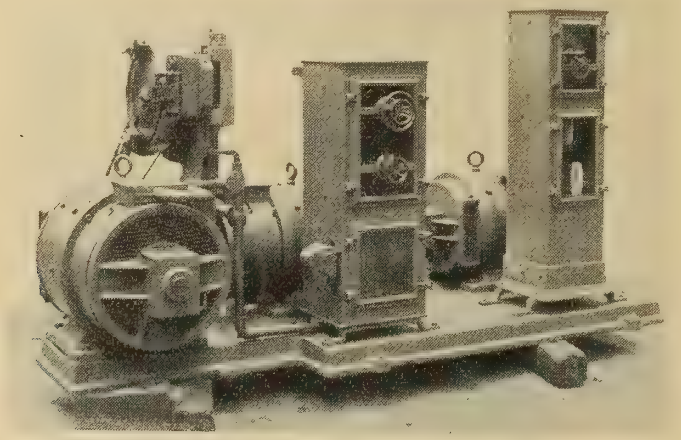
For this purpose a compound-wound motor may be used having a half-hour rating. The squirrel cage motor is often used for this purpose. Its use cannot be declared the most efficient, as for these purposes the motor is required to reverse, and its operation is more satisfactorily accomplished from the point of view of the control-gear with a slip-ring motor.

It may be pointed out that enclosed motors are desirable, to keep chips out of the interior of the motor. In some severe cases pipe-ventilated or drip-proof types are necessary.

The Development of Reversing Tool Drive

The old-fashioned method of mechanical driving of planers and such tools by means of two belts and a belt shifting gear is both wasteful and unsatisfactory and offers considerable scope for improvement. The use of a reversing motor whose direction is controlled by the moving head is an obvious step; the addition of a motor generator of which the direction and strength of the generator field are so controlled is a marked improvement on that method.

There have been some interesting developments in this field. One English manufacturer commencing with a reversing motor, geared directly to the planer table, gradually evolved a slip-ringless magnetic clutch which, it is claimed, offers considerable advantages over the direct drive. For instance, the amount of stored energy to be dissipated at each reversal is much less, consequently the power required to drive the tool is less than with the reversing motor.



Electrical equipment for planer. Complete conversion and control of current. Photograph courtesy Alfred Herbert, Ltd.

Moreover, the effects of inertia due to rapid rotation and reversal of heavy armatures, which are necessary if maximum output is to be achieved, are eliminated.

In the course of his experiments this manufacturer came to the conclusion that the advantages claimed for electrical regeneration were considerably over-rated and involved complications in the switchgear and wiring which are expensive both in first cost and upkeep.

These and other inherent disabilities of the reversing motor drive resulted in him discarding the clutches. Even with this change it was still found that, under the most favorable conditions, with a 40-ton planer table and job operating at normal speeds, the inertia effects of the table and revolving clutch armature were considerable.

Roughly, the advantage secured from the change was in the neighborhood of 45 per cent., reckoning the saving in the power input for a given tool and the reduced period of time within which a complete working cycle could be performed.

Further, research, with the object of securing (a) minimum demand from power mains and (b) the maximum speed of reversal has resulted in a purely mechanical reversing drive which it is claimed gives the maximum output and minimum input ever attained.

The advantages claimed are demonstrated by the following data, taken from a machine thus equipped:—

(b) Planer 3 ft. 6 in. by 3 ft. 6 in. by 9 ft. 0 in., having formerly a magnetic clutch, now replaced by new drive.

Original cutting speed 37 ft. 0 in. per min., now 40 ft. 0 in. per min.

Original return speed 155 ft. 0 in. per min.,now 148 ft. 0 in. per min..

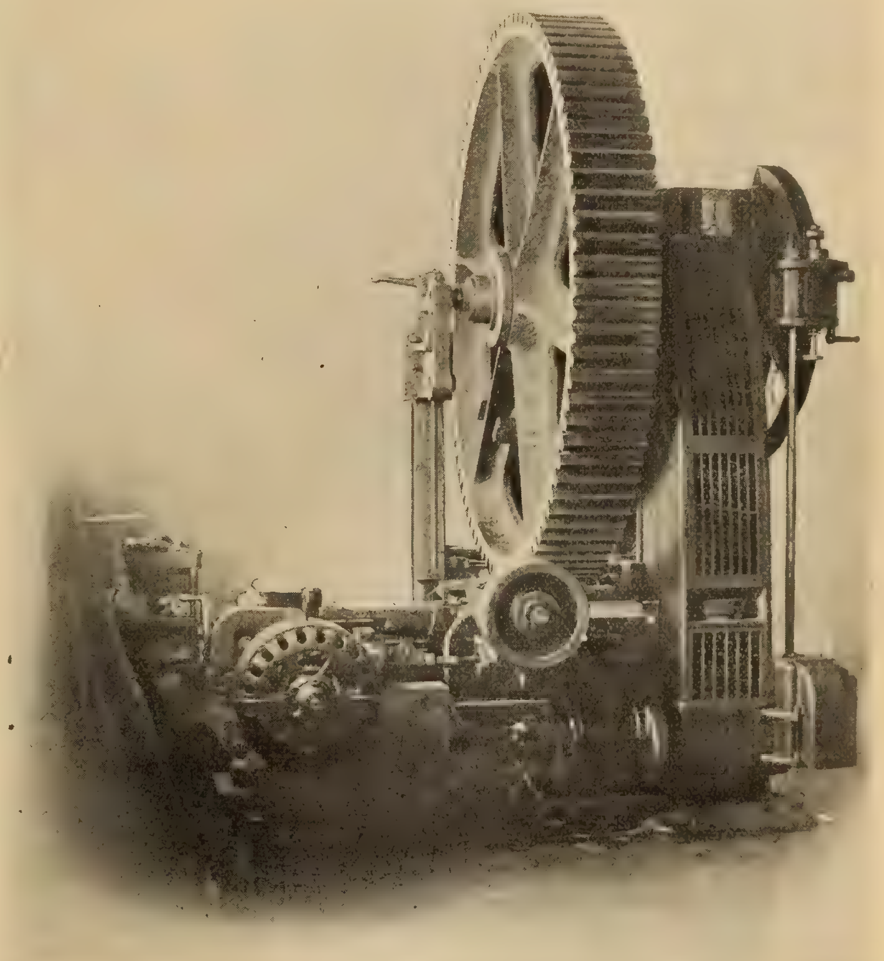
Times required to perform 10 cut and return strokes

Stroke	Magnetic Clutch Drive	New Type Drive
1 ft. 0 in.	1 min. 8 secs.	0 mins. 24 secs.
2 ft. 0 in.	1 min. 50 secs.	0 mins. 43 secs.
3 ft. 0 in.	2 mins. 20 secs.	1 min. 3 secs.
4 ft. 0 in.	2 mins. 36 secs.	1 min. 23 secs.
8 ft. 0 in.	4 mins. 30 secs.	2 mins. 42 secs.
TOTALS	12 mins. 24 secs.	6 mins. 15 secs.

Increased output over 98 per cent.

Control of Machine Tool Motors

Whilst it is now generally recognized that the individual motor drive of machine tools leads to increased production, it has not yet been sufficiently realized that efficient "motor control" may also contribute very materially in this direction. In fact "motor control" is quite as important as "motor drive."



Cutting a large spur gear on a motor-driven Browne & Sharpe spur gear cutting machine. Some idea of the size of the job may be gained from a knowledge of the fact that the finished gear is 90 inches in diameter and has a 12½ inch face. This gear is a steel casting cut from the solid. The gear cutting machine is driven by a 10 horse-power Westinghouse squirrel cage motor at 750 revolutions per minute. A rawhide pinion is used in the motor connection to the driving mechanism. One man runs three machines of this type. Photograph courtesy Hamilton Gear & Machine Co., Toronto.

The starting, stopping and speed control of a motor driving a machine tools are very important factors in its operation and can be accomplished:—

(a) By hand-operated control gear—The control of the motor and tool is in the hands of the operator, and the human element with its liability of error cannot be entirely eliminated.

(b) By automatic contactor or remote control gear,—The workmen may obtain complete control of the tool and motor by simply operating a push button or small master switch fixed at some convenient place near his working position, the main control gear being fixed some distance away.

With this type of control gear, the responsibility for cutting out the starting resistance correctly does not rest with the operator, but is done for him automatically by current-limiting devices which prevent any dangerous rush of current when starting up, and correctly and smoothly accelerate the motor up to speed in the shortest time. It is, therefore. impossible for a careless operator to damage the motor when starting up.

The stopping of the machine in the ordinary way takes a long time but by the adoption of automatic control arranged for dynamic barking this time can be much reduced, and the machine stopped and restarted repeatedly in the shortest safe time. Idle and non-productive time can therefore be reduced to a minimum, and the production per unit machine increased.

The chart, Fig. 1, taken by a recording ammeter in the circuit of a motor driving a machine tool possessing large inertia, clearly shows the advantage to be obtained by using the dynamic brake, in regard to the elimination of non-productive time. Mechanical brakes are provided by the makers on certain machine tools for quickly stopping the auxiliary motors. These can be operated by means of standard brake solenoids.

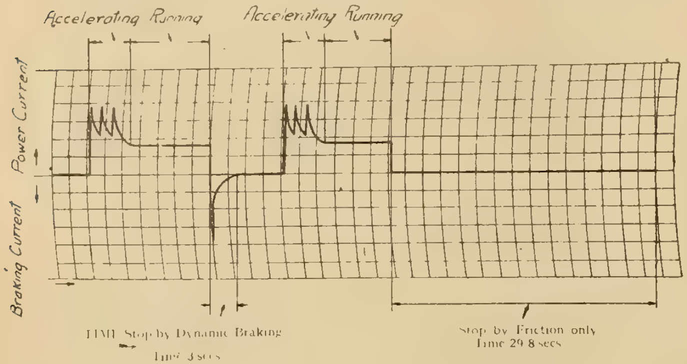


Fig. 1—Advantages gained from a dynamic brake

Electric Fan Can Be Used to Warm Average Room

Editor, Electrical News—

Articles have recently been published in the electrical press advocating the use of electric heaters. In some of these articles the suggestion is made that electric heaters should be used during very cold weather to help out the domestic furnace.

Now it is all very well to give all possible publicity to the advantages of electric heaters; they are most excellent things in their way, but too much, even of a virtue, is apt to become a vice, and a multiplicity of heaters switched on during the winter peak will create a most vicious condition of voltage regulation—so much so that electric lighting will be extremely poor and electric cooking almost impossible if the heating load should coincide, as it probably would do, with the lighting and cooking loads.

There is, however, readily available, a method of helping the furnace, which, while not crippling the resources of either generating stations or distributing systems, will benefit the householder; this method is to employ an electric fan on the very cold days instead of a heater.

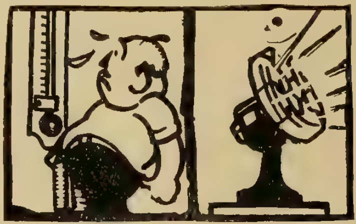
To most people it is not news that the temperature at various levels in an artifically heater room is far from uniform and actual tests show that, under ordinary conditions, the following temperatures may be found in the average room during the winter time in this country:

At floor level .... about 58 degrees Fahrenheit
At five feet above the floor . about 68 deg. Fahrenheit
At the ceiling .... about 80 degrees Fahrenheit

Actual trials made by the writer have shown that, in a room of average size, a 9 inch electric fan will so circulate the air (if pointed at an angle towards the ceiling, there need be no draught felt) that the above temperatures will in a few minutes become, respectively, about 60 degrees F., 65 degrees F., and 70 degrees F., thus creating a very much more comfortable condition.

Not only are one's feet actually warmer but the temperature around the feet and head respectively are much more nearly equal. This in itself tends towards increased comfort. Again, the excessive amount of heat which ordinarily goes to warm up the ceiling, is utilized to good purpose.

All this benefit is obtainable by the expenditure of an amount of energy (in the fan) which is quite insignificant; and it seems reasonable to suppose that an actual saving would be effected by the adoption of this plan on account of the utilization of a considerable amount of heat which otherwise is of very little practical use. Lacking any definite data one hesitates to estimate what such saving might amount to, but at least it would probably be much more than to counter-balance the cost of the small amount of electric energy required to run the fan. In view of the foregoing it would be a better policy for all concerned if the electrical press would advocate the use of electric fans, during the period when furnaces are in use, rather than of electric heaters. Even with an electric heater a fan will greatly increase the efficiency of distribution of the heat developed and add much to one's personal comfort if one has the patience to wait until a comparatively small heater of, say, 660 or 1,000 watts capacity, has had time to warm up all the air in the average room.



Using fan to raise the temperature

The benefit of this plan will easily be felt on a cool day in about an hour and though the room may feel chilly during the warming up period much greater comfort will be experienced afterwards.

The highest desideratum of any system of heating is to make people feel comfortable, not necessarily to reach any particular temperature and a fan will greatly assist in doing this—Try it!

Yours truly,
A. S. L. Barnes.

High Tension Line from Lake Buntzen to Britannia Beach

Mr. George Kidd, general manager British Columbia Electric Railway Company, announces that his company has entered into an agreement to supply the Britannia Mining & Smelting Company with 4,500 to 6,000 h.p. of electric energy. The power company will start work at once on the construction of a high tension line from its Lake Buntzen generating plant to Britannia Beach, a distance of some 30 miles. The Britannia mine has a 2,735 h.p. plant, but during exceedingly dry weather in summer or cold weather in winter the water supply has sometimes given out; even under normal conditions it is necessary to supplement the water power by steam. The mining company will build its own substation.

Westbury Company Expanding

The Westbury Electric Light & Power Co. of Cookshire, Que., have purchased of Mr. A. G. Hurd, of Sawyerville, Que., the electric light business, including all electrical apparatus, transformers, transmission lines and etc. Mr. Hurd has owned and operated the Sawyerville plant for years.

The Westbury Electric Co. are building a 3,000 volt transmission line from Cookshire to Sawyerville, a distance of six miles, and will supply Sawyerville and Eaton Corner with 24 hour service off their own power plant, situated in Westbury. The company are changing the Sawyerville system from 125 cycles to 60 cycles to correspond with their present system. They expect to have the line in operation early in November.

Commercial Section to be a Strong Part of Canadian Electrical Association

W. O'Brien Elected Vice-Chairman—Subjects for Reports—Special Study of Particular Phases—Appointments Made to Various Bureaus

On Thursday October 26th., at the joint call of Mr. P. J. Davies the president of the Canadian Electrical Association and Mr. L. W. Pratt the chairman of the Commercial Section, an organization meeting of the section was held in the Association's headquarters, 65 McGill College Avenue, Montreal.

Mr. Pratt wired his regret at not being able to be present; Mr. R. B. Cockburn, Canadian Westinghouse Company, Montreal, and Mr. C. F. Barnes, Toronto Niagara Power Company, were also absent. In the absence of the chairman, Mr. P. T. Davies presided.

P. T. Davies, President, C.E.A.

The meeting was attended by the following members: W. O'Brien, Montreal Light, Heat & Heat Consolidated, Montreal; A. S. Edgar, Canadian General Electric Co. Ltd., Toronto; J. H. O'Hara, Ottawa Electric Company, Ottawa; G. R. Atchison, Southern Canada Power Company, Ltd., Montreal; K. A. McIntyre, Canadian Representative, Society for Electrical Development, New York; P. R. Labelle, Shawinigan Water & Power Co., Montreal, and E. C. McGovern, Northern Electric Company, Limited, Montreal. H. A. Lane, director of the Joint Committee for Business Development, N. E. L. A., New York, and Louis Kon, secretary of the association were also present.

Mr. Davies informed the meeting that the executive of the association wished to have the Commercial Section developed into as strong and important a part of the association as the Technical Section is at the present time, and expressed the hope that a great deal of important and valuable work will be done by the various bureaus and committees during the present year. He mentioned also that it is expected to give a considerably larger portion of time during the next convention to the discussion of commercial problems and subjects.

Due to the fact that most of the chairmen of the bureaus and members of the general committee are Montreal men, and the chairman of the section may not be able to call and attend meetings as frequently as may be desirable and necessary, on account of his residing in Hamilton, it was suggested that a vice-chairman be elected, in which Mr. Pratt also concurred. Mr. W. O'Brien was elected vice-chairman.

It was thought that during the year there may be two or three general meetings attended by all the members, besides the meetings of the various bureaus and sub-committees, if such were found to be necessary, which would be arranged for by their respective chairman.

Mr. Davies emphaized the necessity of proceeding with the work of the section immediately and report progress every month in time for the meetings of the executive committee of the association.

The chairmen of the bureaus were asked to choose their own subjects for study and reports to the convention, it being suggested that such subjects as "Increasing Industrial and Domestic Lighting" might be a suitable subject for the report of the Light Sales Bureau. "Spread of Profit in Sales of Appliances" for the Merchandising Sales Bureau. "The Contractor, the Dealer and the Contractor-Dealer as a Factor in Increased and Improved Sales of Illumination and Appliances" for both the bureaus, etc. The discussion of the sections' or bureaus' reports in annual proceedings, which is being mailed to all members, may also suggest some subjects.

The president explained that the purpose of organizing a general committee of the section, which is an innovation introduced this year, was to have a certain number of men closely connected with the section who would undertake to make a special study of particular phases and problems for the existing bureaus or who would take responsibility for organizing such bureau divisions.

W. O'Brien, elected Vice-chairman Commercial Section

Mr. Lane explained the purpose of the joint committee, what it aims to accomplish, and by what means, and expressed his hope that the general committee of the commercial section may eventually become the local Joint Committee for Business Development of the C.E.A.

The Commercial Section, naturally is considered as the channel through which the work af the N. E. L. A. Joint Committee will be carried on.

The following appointments were made to the various Bureaus:—

Power Sales Bureau

Chairman, W. O'Brien, Montreal Light, Heat & Power, Montreal; R. P. Labelle, Shawinigan Water & Power Company, Montreal; J. H. O'Hara, Ottawa Electric Company, Ottawa; G. R. Atchison, Southern Canada Power Co. Ltd., Montreal; D. M. Gall, Montreal Light, Heat & Power Cons., Montreal; R. H. Doddridge, Quebec Railway, Lt. Ht. & Power Co., Quebec; P. S. Gregory, Shawinigan Water & Power Company, Montreal; P. T. Davies, Southern Canada Power Co. Ltd., Montreal; L. H. Marrotte, Mtl. Public Service Corporation, Montreal; G. D. Wright, Ottawa Electric Company, Ottawa; W. E. Goring, Hamilton Cataract Power & Light Co., Hamilton; G. Gale, Hull Electric Company, Hull, P. Q.; H. C. Smith, Nova Scotia Tram. & Power Co., Halifax, N. S.; J. M. Robertson, J. M. Robertson & Company, Montreal; J. A. Fletcher, Canadian General Electric Co., Montreal; H. E. Blatch, Canadian Westinghouse Co., Montreal, and W. O. Taylor, Northern Electric Company, Montreal.

Light Sales Bureau

Chairman, J. H. O'Hara, Ottawa Electric Company, Ottawa; Geo. McDougall, McDougall, Pease and Friedman, Montreal; G. J. Beattie, Electrical Contractor, Toronto, Ont.; N. L. Engel, Montreal Public Service Corporation, Montreal; E. D. Fairweather, Southern Canada Power Company, Montreal; L. S. Sach, Montreal Light, Heat & Power Cons., Montreal; G. Newall, B. C. Electric Company, Vancouver, B. C.; F. T. Groome, Holophane Company, Toronto, Ont.; W. J. Orr, Canadian Westinghouse Company, Toronto; (Appointee), Northern Electric Company, Montreal; F. W. Loomis, Canadian General Electric Co., Montreal, and R. M. Love, Canadian General Electric Co., Toronto.

Merchandise Sales Bureau

Chairman, G. R. Atchison, Southern Canada Power, Montreal; C. D. Slimpin, Montreal Light, Heat & Power Cons., Montreal; W. T. Smith, Ottawa Electric Company, Ottawa; (Appointee), Nova Scotia Tramways & Power Co., Halifax, N. S.; H. Warren, North Shore Power Co., Three Rivers, P. Q.; Mr. Walker, B. C. Electric Company, Vancouver, B. C.; A. S. Edgar, Canadian General Electric Co. Ltd., Toronto; E. G. McGovern, Northern Electric Co. Ltd., Montreal; R. B. Cockburn, Canadian Westinghouse Co., Montreal; L. A. Mace, Can'n. Comstock Company, Ltd., Montreal; F. D. Baker, Household Equipment Co., Montreal; D. F. Streb, Electric Shop, Saskatoon, Sask.; H. C. Hall, The Electric Shop, Moose Jaw, Aa.; G. W. Hillas, Hillas Electric Co., Edmonton, Alta.; J. H. Schumacher, Schumacher-Gray Company, Winnipeg, Man., and E. W. Beard, Budden-Beard Company, Calgary, Alta.

Commercial Service Relations with Customers

Chairman, C. T. Barnes, Toronto & Niagara Power Co., Toronto; J. A. Beaudin, Montreal Light, Heat & Power Co., Montreal, and H. T. Anscombe, Ottawa Electric Company, Ottawa.

Mr. R. P. Labelle was appointed to represent the C. E. A. on the Joint Committee for Business Development, N. E. L. A.; Mr. A. S. Edgar, Canadian General Electric Company, Toronto, to represent the Section on the Salesman's Hand Book Committee, and Mr. D. M. Gall, Montreal Light, Heat & Power Company, to represent the Section on the Electric Vehicle Bureau, to correspond with the two above mentioned in the N. E. L. A., which will be organized in the C. E. A. for the present year.

A Large Transformer Order—200 Distribution Type to be Exported

The Ferranti Meter and Manufacturing Company, Toronto, have just closed what is said to be the largest order for transformers ever placed in Canada, for export. The Southland Power Board of Invercargill, New Zealand, has placed an order with this Canadian company for 200 distribution type transformers, three phase, 11,000 volts, in five, ten, fifteen, twenty and thirty kv.a. sizes. The transformers will be designed for fifty cycle circuits, and will be delta connected on the high tension side and star connected to the low tension winding.

This order is of special interest and satisfaction to the Canadian electrical industry in that it was obtained in competition with German, Swedish, English and United States firms. Not only that, but the order was placed on a quality, and not a price, basis the competing tenders being lower than the Canadian firm's figures. The Ferranti Company submitted with their tender a sample transformer built to the New Zealand specifications and we understand the award was largely influenced by the details of transformer construction, coil impregnation and the welded steel tanks.

This order furnishes food for thought for all Canadian manufacturers. Perhaps we are too much inclined to underrate our own ability in world competition. Perhaps after all in our quiet, thorough way we really do turn out better products than they do in the United States or in Europe, or even in the Old Mother Land. This order should encourage us to have more confidence in our own ability to produce goods that will meet the competition of world manufacturers where ever it may be encountered.

Hardening Old Street Railway Rails

A process of rail-hardening is being undertaken by the Toronto Transportation Commission, designed to improve the condition of old rails without lifting them out of position. It is called the Sandberg sorbitic treatment and consists of applying a flame to the top of the rail, this flame traveling slowly along the surface and being followed by the application of a water jet for cooling. The process has not been previously used in the United States or Canada, but has been successfully tried out in a number of English cities, where accurate rail measurements indicate that the life of the rail is prolonged two or three times. It is also claimed that corrugation is prevented by the flame treatment; that is; the rail will not become rough and "bumpy" with use. The hardening process affects the rail to a depth of as much as one-quarter of an inch. The machine treats 180 feet of single track (360 feet of rail) in 12 hours. It is intended to deal with one mile this fall, and an additional mileage next year.

Completion of French High-Power Station

A successful test of the new French high power station at St. Assise, Department of Seine et Marne, was recently made with the United States. This station has been in course of construction for the past two years and will shortly be opened to public traffic with America.

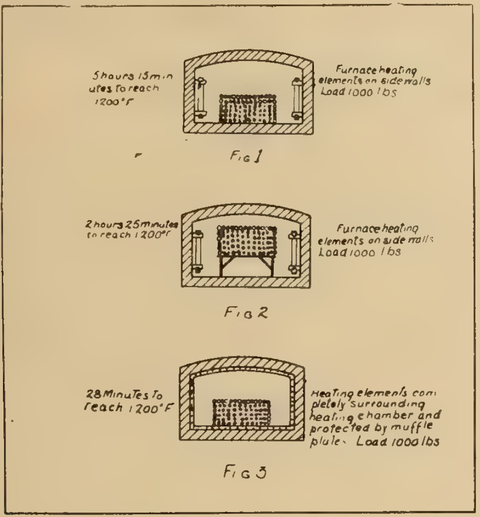
The Standard Electric Crane & Hoist Co., Philadelphia, announce that they have just made arrangements with the Lyman Tube & Supply Co., Ltd., Montreal, to represent them as their exclusive agents in the Dominion of Canada.

Design of an Electric Furnace For The Heat Treatment of Steel

Requirements Included Ability to Heat 5,000 Pounds Steel to 1650 Degrees F.—Necessary to Liberate Heat as Fast as Charge Could Absorb It—Nickel Chromium Elements Used

By A. W. LAMONT, Assistant manager,
Canadian Westinghouse Co., Winnipeg*

Large industrial electric heat treating furnaces reached a high state of development during the war and today their status compares favorably to the electric motor fifteen years ago, both as to connected load and apparatus available. Sufficient installations for heat treating have already been made to demonstrate conclusively that increased productions, better quality of product and lower operating result than from other types of furnaces.


5 hours 15 minutes to reach 1200°F
Furnace heating elements on side walls Load 1000 lbs
Fig 1
2 hours 25 minutes to reach 1200°F
Furnace heating elements on side walls Load 1000 lbs
Fig 2
28 Minutes to reach 1200°F
Heating elements completely surrounding heating chamber and protected by muffle plate. Load 1000 lbs
Fig 3

Elevation sections showing development of Electric Furnace

The Transcona Furnace

The early type of electric furnace was constructed on the principle shown in Fig. 1. The length of time required to bring the entire load to a uniform predetermined temperature in a furnace of this design was found to be excessive and later on the principle shown in Fig. 2 was employed with the encouraging results as shown. The most recent development in the arrangement of the heating coils is shown in Fig. 3, and this arrangement is followed out in the Transcona installation.

The work for which the Transcona Furnace was designed consisted of heating 5,000 lbs. of locomotive side rods and main rods from room temperature to 1,650 deg. F, and it was desired to construct the furnace bottom on a car so that the charge could be rolled in and withdrawn on the car.

In order to make the furnace of maximum efficiency, all things considered, it was necessary to liberate heat therein just as fast as the charge could absorb it and also to insulate it so that a minimum of heat would be lost by radiation. The total heating element capacity desirable after considering the above was determined at 220 kw. and the radiation losses at 1,650 deg. F. were estimated at 48 kw. giving a thermal efficiency at that temperature of 80%.

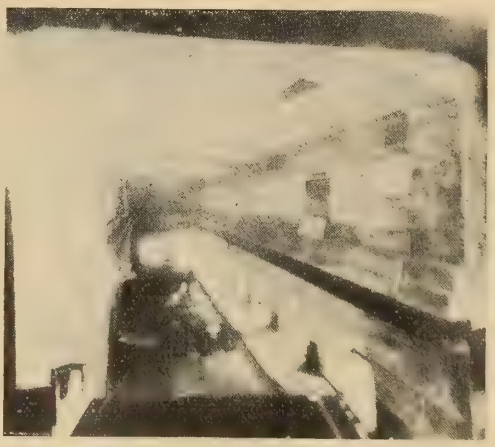
Nickel Chromium Heating Elements

The best commercial element yet developed for furnaces of this type is pure nickel chromium wire which is practically non-oxidizing up to a temperature of 2,000 deg. F. The question of prime importance is to keep oxidation down to a minimum. A round wire was therefore chosen as the surface exposed to oxidation is a minimum. The size of the wire used is made as large as is commercially feasible for the following reason. If you increase the diameter of a round wire so that the weight is doubled there is only an increase of 41.6 per cent of oxidizing area.. From the above considerations No. 1 B & S round wire was chosen for the furnace under discussion and each heating unit was made interchangeable, consisting of six bars, each approximately 7 feet long, with No. 3/0 B.S. wire of the same composition butt welded to each end for terminals.

There are twenty-four of these coils in the top and sides of the furnace. Each group of twelve coils is connected to give a balanced load on 180 volts three phase, 4 coils being connected in series. In the car bottom there are twelve coils divided into two groups, one for each compartment, and they give a balanced load on 90 volts three phase, two coils being connected in series on each phase.

Special Muffle Plates

The coils in the car bottom are held in place by the grooves in the muffle plates which cover them over. Over the top of these muffle plates a floor of cast non-oxidizing ribbed plates is laid. The floor plates rest on supporting fire brick shapes and do not allow any load to rest on the muffle plates of the heating units. The muffle plates are a special combination of earths having a thermal conductivity twenty times that of alundum and having a high dielectric strength at furnace temperatures. These plates serve not only to protect the element wire from injury or short circuit but also distribute the heat uniformly over the entire inner surface of the furnace. The muffle plates also help



Interior of the Furnace

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*Abstract from paper before E.I.C., Winnipeg.

to exclude a large portion of the oxidizing atmosphere of the furnace from the element wire thus reducing the oxidizing effect on the wire.

Uniform Temperature Automatically Obtained

In the design of the furnace in question it was desirable that a uniform pre-determined temperature be maintained automatically throughout the period that the material was absorbing the heat after this temperature of the furnace had been reached. In order to accomplish this two thermo couples were inserted in the furnace, connected to a Leeds and Northrup graphic recording pyrometer having two point control. These controls, through suitable relays, operate magnetic contactors. When the temperature of the furnace tends to rise above the setting of the instrument, the heating circuit is opened and when the temperature tends to fall below this value it is again closed. A uniform temperature within 1/2 of 1% can be maintained with this equipment.

Operation of the Furnace

In one instance a charge of approximately 6,000 lbs. of locomotive side rods and main rods were placed in the furnace at 8.10 a.m. At 1.00 p.m. the furnace had reached the pre-determined normalizing temperature of 1,200 deg. F. and the pyrometer which had previously been set to operate at this temperature operated the relays. This is turn caused the magnetic contactors to open and drop the load. At this time however the charge had not absorbed sufficient heat to soak it to the centre of each rod.

In approximately five minutes the charge had absorbed sufficient heat to reduce the furnace temperature six degrees and the pyrometer again caused the load to be thrown on. This cycle of operation was contained until the charge had completely soaked at the pre-determined temperature.

As soon as the kw. input balanced with the known radiation losses of the furnace it was then clear that the charge was not absorbing further heat.

The pyrometer and main switch were then opened and the current entirely disconnected. The furnace was allowed to cool until its temperature had reached 1,000 deg. F. and then the charge was drawn. This cooling is necessary before the door of the furnace is opened as the rods would oxidize if drawn at a higher temperature.

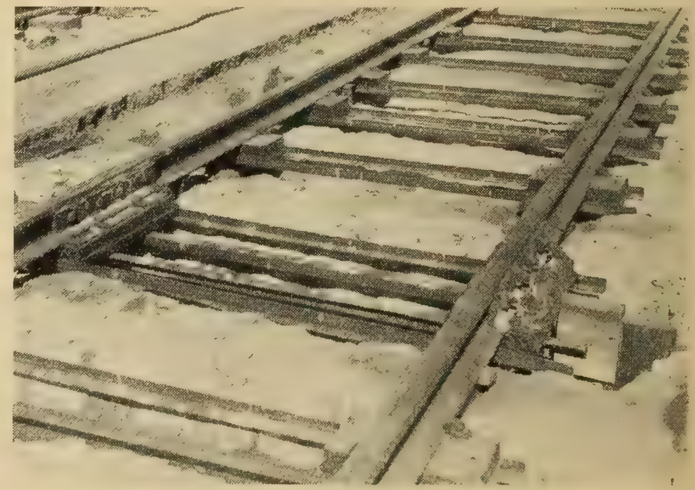
Resilient Ties Used on Rehabilitation Trackwork by Winnipeg Electric Railway Company

In the city of Winnipeg, Man., the Winnipeg Electric Railway Company has been carrying out in the last two or three years, an extensive rehabilitation programme. One of the most important pieces of this work but recently completed, is that on Main street, north, where, for an extent of 0.8 miles, the company has relaid the double tracks.

The type of construction followed was that of a heavier rail used in conjunction with the Dayton mechanical resilient tie. Before adopting this type of road-bed, the company gave the matter careful consideration, as the nature of the sub-soil in Winnipeg presents many and serious problems in the constructing of street car tracks. After much research, the company's Maintenance of Way Department came to the conclusion that the Dayton resilient tie was the proper tie to use in Winnipeg, as it afforded the opportunity to get away from the rigid type of track construction standardized in the past.

Spading concrete around ties

About 1,500 ties were used in this work and were placed in position with great facility. After lifting the old tracks it was found that the existing road-bed was in good condition and the company was able to use it as the foundation for this new work. By the adoption of these ties, a large saving in money was entailed in the fact that not so much excavation for depth of concrete was required as in previous methods of construction, nor was the work of installing these ties as great.



Completed track at joint tie ready for concrete

The company stands as the pioneer of this cushion-like construction in the Dominion of Canada, and is confident that the outcome of its adoption, together with certain standards of its own, will give entire satisfaction. The accompanying illustrations convey a very good idea of the procedure of the work. The work was carried out under the supervision of Mr. S. Wilkins, engineer of Maintenance of Way and Structures.

BETTER MERCHANDISING

Why Weren't the Contractor-Dealers Present?

The big Contractor-Dealers' Convention is over.

The members of the committee—some of them—worked like heroes.

The total attendance was highly satisfactory—around three hundred.

The programme was unusually valuable from the contractor-dealers' view point—it represented years of intimate experience with merchandising.

There was just one fly in the ointment—**the contractor-dealers were not present.**

Why didn't the contractor-dealer attend?

Frankly, we don't know.

Was it an inconvenient date?

Was the programme not to his liking?

Was the personnel of the committee not acceptable?

Did it cost too much?

The men who worked hardest to make this convention a success are the most discouraged. Who will offer a solution of the lack of contractor-dealer interest? If any of our readers will commit themselves to paper—anonymously or otherwise—we'll print it, in the hope of reaching an answer to a difficult question.

Ben Socket Attended the Convention

His Comments on the Proceedings are Somewhat Caustic, Especially Regarding the Absence of Contractor-Dealers

Bytown, Nov. 20/22

Dear Mr. Editor,

It is almost three months since I have written you, and I am sure you and your readers must have thought that Ben Socket was spending his vacation at a seashore, followed by a prolonged rest in the mountains and preparations to spend part of the winter in Bermuda, and that Plug was out of business, and therefore, I had nothing to write to you about.

No Mr. Editor, Socket is gradually pulling himself up and Plug continues to make rounds of the jobbers, forfeiting his credit in one jobbing house after the other; Ben says he is pretty close to the end of the rope. As soon as he has stung the last jobber he will be no more an "Electrical Contractor."

I had nearly finished a letter telling you of my personal experiences in trying to buy some electrical appliances, but Socket has just returned from a Contractor-Dealers Convention in Toronto, and I have overheard so many amusing incidents in his chat with my husband, that I have decided to share them with you.

Had to Attend the Convention

Toward the end of last week Socket asked my husband for a small and short loan, as he had to make a fairly heavy expense for a trip to a Convention; he came to our home after supper to get the money and I so much enjoyed listening to his story of the convention that I have decided to write to you about it.

Ben Socket believed in conventions

There may be certain parts of his story that he might not wish to have repeated, but they are too good not to be passed on to others; besides, as you know Mr. Editor, we women, although we greatly dislike to have any stories told about ourselves, do not mind a bit telling other people's stories.

I hope Ben will not get angry with me, and I hope that the electrical contractors will read his viewpoint, quite carefully.

My husband expressed to Socket his satisfaction at his going to a Convention held some distance away from his home; he was sure that is was not the customary banquet that prompted him to go. We suspected as the main reason of his going the awakening of a greater ambition. Our surmise was quite borne oue.

"Well" said Ben, on his return, "I wanted to find out how far behind I was in comparison with the organized and wide-awake contractors and dealers where they have been at this organization work for a number of years and where they have more favorable conditions and get, probably, more support in conducting their business in a business-like manner than elsewhere in Canada; I wanted to improve myself by listening to the speakers at the Convention, but above all, I was afraid to be taken for a "dead one" beyond possibilities of revival.

"The plans of the Convention Committee and the campaign for attendance at the convention were very vigorously carried on for weeks, with every body's assistance, culminated in a strong appeal by the electrical trade paper to be on hand or to be put on the disgrace list of the dead ones.

"I believed it would be, in fact, a census taking of the electrical contractors of Canada, or at least of the Province of Ontario; those present to be recorded as live ones and the rest as dead ones."

"And how **was** the Convention" my husband asked impatiently anticipating a very interesting story.

Ben Shifted his Chair

Ben shifted his chair, looked around as if afraid of the presence of someone not wanted, and finally with his characteristic "Oh hell!" delivered himself of the following story:

"How was the Convention? Well, from the point of view of attendance of electrical contractors and dealers it was just about like the beer they have in Toronto, about 2-1/2%.

"As soon as I registered my name, to be sure that I would get a seat and handed over a few bones as a sign of good faith on my part, I got a badge which let everybody know that I was attending the Electrical Contractors' and Dealers "Convention."

"We went to have breakfast in a cafeteria; it was here that I got the first proof of the confidence people of Toronto have in us fellows.

"I placed all my eats on the tray and when I got to what I thought to be a cashier, but who proved to be the credit manager, I got just a slip of paper with total and itemized cost of every article.

"Naturally, by habit, I pulled some money out of my pocket, but the girl just smiled and looking at my badge said: Pay as you go out.

"It certainly made me feel big to be trusted with a square meal like that.

"I forgot to tell you that the Convention was held in the King Edward, Toronto's finest hotel; the next one may have to take place in the Home for Incurables.

Ice Water 'Neverything

"At twelve forty-five we had a fine luncheon. It was certainly a fine and enjoyable meal; good food, plenty of music, singing and ice water; every body was happy and looking around to see if there were any contractors and dealers present.

Frank Groome exposed wrong methods of lighting

"After lunch all were asked to assemble in the Pompeian Room to listen to five short but splendid addresses on selling electrical fixtures, washing-machines, ranges, suction sweepers and good lighting.

"Frank Groome—you must know Frank Groome; everybody knows him— was the chairman of the meeting and the speaker on the last mentioned subject.

Store Window Exhibits

"There was a very fine exhibit of two store windows put on by the C.G.E. to suggest to the dealers proper illumination and attractive display.

"One of them showed the evolution of the lamp since artificial light first became known; it was a most interesting and educative display.

"It is wonderful what progress illumination has made, soliloquized Ben, but it is most astonishing how very few rays are penetrating into the business methods of the electrical contractors and dealers.

Tom Kelly uses short sentences in selling cleaners

"Of course these short addresses contained most helpful hints to any contractor and dealer on how to handle and to improve his business, but again there were hardly any contractors and dealers present to take advantage of this seed purposely scattered in such a form as to make it germinate in the most barren soil.

"There was a good attendance of jobbers and manufacturers' representatives, of the trade and newspaper men, professional organizers, central station men, but those for whom the convention was meant, and who need the education, were not there.

Good Salesmanship

"Tom. Kelly, of the Hoover Company, used a most effective and appropriate method of explaining the elements of good salesmanship—he used short salesmanship sentences displayed before his listeners in bold type on large sheets of paper, supplementing each by his own tersely worded emphasis or actual experiences in following that method of salesmanship.

"Joe. Heffron gave a dandy talk on selling fixtures and Mr. Fox—I forgot his first name, but he sells "National" goods—told how to sell ranges. I wouldn't like to meet that fellow Fox if I hadn't the money to buy an Electric range. F. S. Babcock, of Easy Washer fame showed us how to sell more washers.

"The last talk of that afternoon was given by Frank Groome. It was'nt a honeymoon trip into the realm of illumination, as far as Mr. Groome was concerned. He gave many valuable explanations and suggestions gathered in his active and successful years of selling better lighting, and he exposed the wrong methods employed so frequently by the contractors and dealers.

"Good thing that it was not scheduled as a revival meeting and that Frank did not call for sinners.

Joe Heffron illustrated best methods of selling fixtures

"A chap next to me, one of the two and a half per cent, told me that recently he was asked a price for changing lighting in a church.

"It was'nt a case of his own initiative and an attempt to increase his business through suggesting to the church wardens that collections could be increased if everyone in the congregation could see what size of coin is being put on the collection plate, but a case of the congregation not being able to read the hymn books on account of poor illumination.

"He inspected the church and instead of submitting a price he suggested to the wardens to spend about one hundred and fifty dollars on new hymn books with larger type because, to improve their illumination, it would cost almost three or four hundred dollars.

My husband flung his paper on the floor and with a mighty "Great scott" remarked that he would like to have a look at that fellow, though he would not care to be near him.

He wondered "if a tinsmith who may be asked to state the cost of fixing a leaking roof would suggest buying umbrellas and rubber boots as it might be cheaper."

But, It Was Worth It

I insisted on Ben continuing his story of the Convention without interruptions from my husband, who actually began to think that after all Socket was not such a hopeless case as he had always believed him to be.

"Now, let's see," he began again recalling where he stopped at, and; "Oh yes, there was a banquet that night on the seventeenth floor.

Dr. Cameron, a brilliant preacher, spoke on Idealism in Business

"Too high you say?

"Wait till you hear the price.

"But it was worth it.

"One of the most pleasing features of the banquet was the fact that no man in the electrical industry thought himself too big to be present. The biggest and most prominent men among the officials of the power stations, manufacturers and jobbers were there. They all are willing and anxious to assist the contractors and dealers to improve their business and their methods of doing business.

"The menu was fine from soup to nuts; besides which there were also Brazils, one of them half shelled, contributing to the enjoyment of the evening by good singing and general hilarity, despite the fact that the toasts were run on dry batteries.

"Mr. Ellis, the chairman of the Toronto Hydro Commission spoke most interestingly, and at length, of the accomplishments of the Hydro since its inception and the potential possibilities of its future; there might have been some anxiety felt by the contractors present lest they be absorbed as well, though I do not fear it; the Hydro, as a rule take only the things worth while taking.

"Dr. Cameron, a brilliant preacher, spoke most enthusiastically of idealism in business. Momentary interruptions of his most inspiring address by occasional misbehavior of certain groups were effectively stopped by the chairman, Mr. Harry Hicks.

"The next day we again had an enjoyable luncheon and most profitable fore and afternoon sessions.

Poor Attendance of Contractor-Dealer

"However, it was another case of not "Where is my boy to-night," but "Where are our contractors and dealers today."

"One had to ask himself, looking over the audience, "Why is it called a contractors and dealers convention?" Why in the name of common sense were not those present who need so badly, for their own sake more than for the sake of the rest of the industry, the very kind of education that was so ably prepared for them; education which they must acquire if they do not wish to be crowded out of business and supplanted by men who are capable and willing to be good tradesmen and business men fit to be assimilated, instead of becoming an indigestible lump in the young and vigorous organism of the electrical industry.

"Sam Hibben of the Westinghouse Company from New York gave a most admirable scientific but popularly worded paper on "What is illumination—its effects and advantages," supplemented by very interesting demonstrations; information which is very little known to most of our contractors who are supposed to be building up their business through the sale of more and better lighting.

"Gordon McLaren, president of the Ontario Jewellers' Association gave us a most interesting parallel between the conditions in his line of business and those of an electrical contractor dealer, particularly in reference to the keeping of a store.

Co-operative Advertising

"He explained their advertising schemes of which he particularly commended, as productive of results, local co-operative advertising campaigns, assuring us that their periodically and consistently appearing stories in the daily press on why people should buy lasting gifts of jewellers had a very stimulating effect on improving sales; he also stated that in the jewelry business there is a certain number of men who are not and never will be business men. This type undoubtely will soon have to disappear from the field. Listening to him one had to admit what poor salesmen we electrical dealers are, if we cannot succeed in selling appliances that are not only a decoration but every day necessity, health and labor saving devices, compared with the jewellers who sell broaches and trinkets only by using as their appeal 'Buy lasting gifts' and by persuading people that wrists, ears and fingers were given to human beings by nature merely to wear wrist watches, ear rings and rings.

The Fellow Who Does The Figuring

"Service-Henderson of Brantford, the fellow who does the figuring for the Canadian electrical contractors, spoke on financing business.

"I felt very uneasy while he talked. It seemed to me that everybody present was looking at me while he was explaining the way most electrical contractors figure their jobs and keep their accounts.

President Harry Hicks bought a swanky overcoat for the occasion

Of course he did not mean me personally, but my conscience-meter was registering very fast.

"Some fellows perhaps thought he was trying to make profiteers of electrical contractors with his insistence about charging rent against the overhead expense even if you owned the building and had no rent to pay, or the upkeep and running of a car, though it be a Ford.

"His explanations on what the contractors and dealers are doing to themselves and to their business by not using business methods and where it is and will continue to land them, was almost parallel to the case of the negro woman who came to work one morning full of tears, giving as the cause of her grief, the death of her husband. "And did you have a doctor?" she was asked, "No, he died without anybody's help."

Not Much to Say About It

While in Toronto, I studied the window displays of the contractors and dealers, expecting to see, on the occasion of their own Convention, at least an attempt to show pride and interest in their own business, but there is not much to say about it.

"You may think that I do not appreciate a Convention, but I do; I am glad that I went; I have learned a lot and I am encouraged, feeling that I am not as dead as some are. Besides I know now, if we have a convention in our little town, whom to ask us to put it across; Charlie Hopper will surely be approached to handle the job, because he knows how to arrange it and how to choose the right kind of fellows to help in making a convention a success.

"I am also convinced now that frequent 'extension courses' on wiring, illumination, sale of appliances, cost accounting bookkeeping as they had it in Toronto during the Convention is what will help to put us on our feet and will teach those of us who are teachable to be what the public and the rest of the industry expect to be."

This is Ben Socket's story of the convention; from now on I shall watch Ben closer still than I have done, to see if it is an artificial inspiration carried away from the Convention or some lasting benefit.

And I will share my observations with you, Mr. Editor.

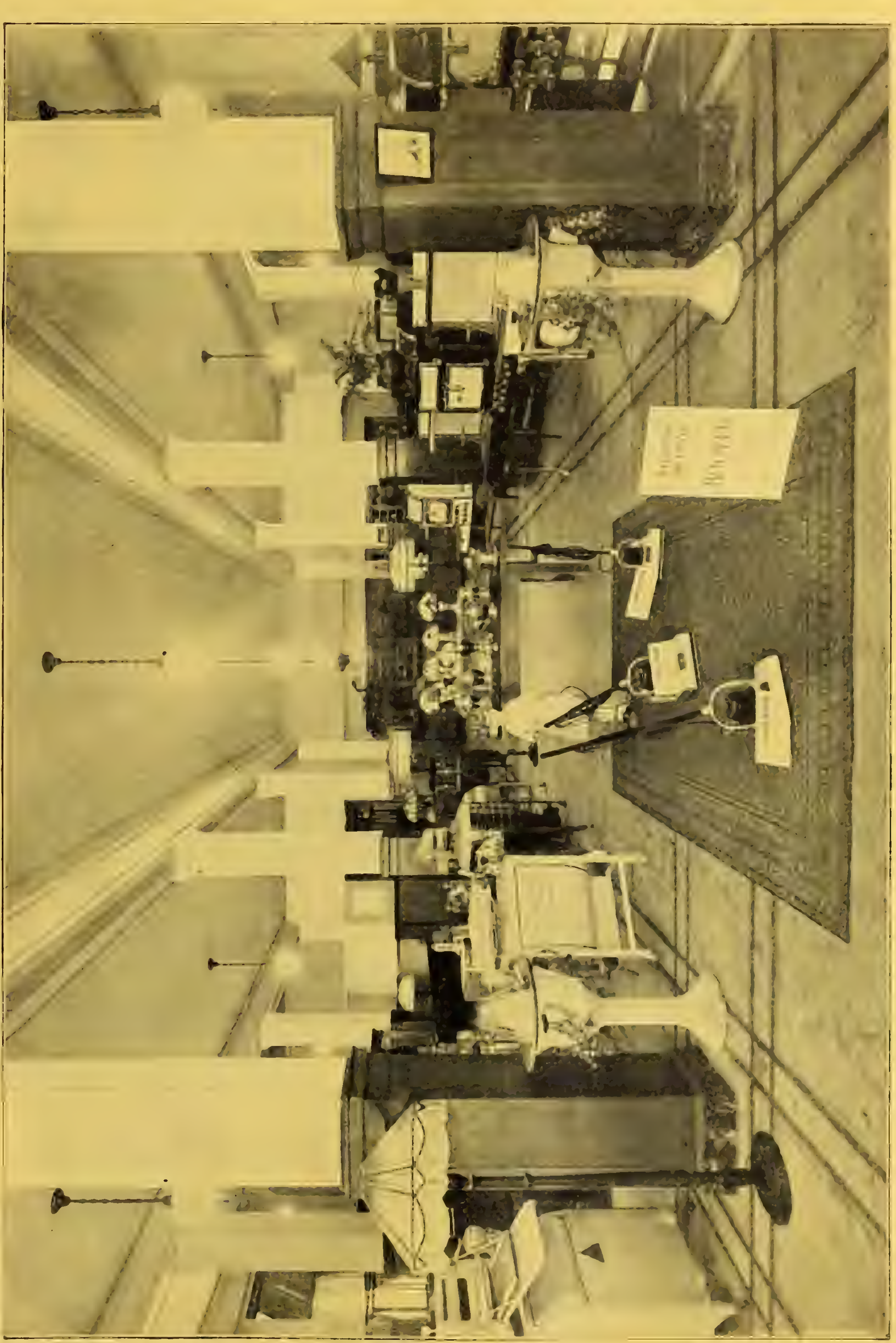
Yours very truly,
I. M. Buyer.

December 11th to 16th—Hoover Week

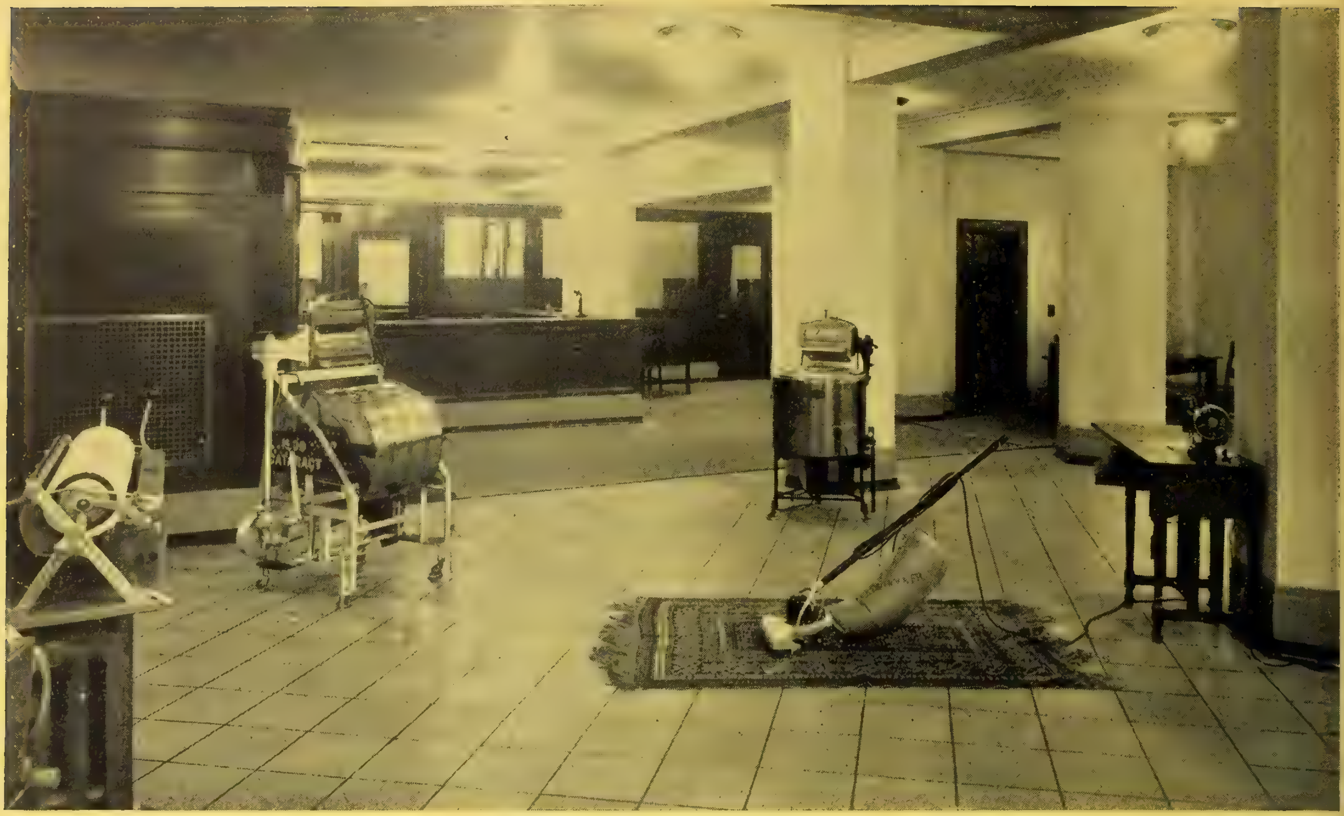
According to an announcement by the Hoover Suction Sweeper Company of North Canton, Ohio, December 11th to 16th, 1922, has been designated as the time for their annual Hoover Week. During the past, Hoover Week has always had the active support of Hoover dealers and it is expected that this year's event will bring forth both more enthusiasm and greater results. As usual, a feature of Hoover Week will be the window display contest which is always earnestly participated in by dealers. To make it even more attractive for the dealer to enter this year's contest the number of major cash prizes has been doubled. In addition there are thirty smaller prizes. Hoover Week is being brought to the attention of the general public by national magazine advertising in December issues. This publicity will tie-up advantageously with the special efforts of dealers during the event. Special display material and literature are also being supplied by the Hoover Company.

The Mechanics Supply Co., Quebec

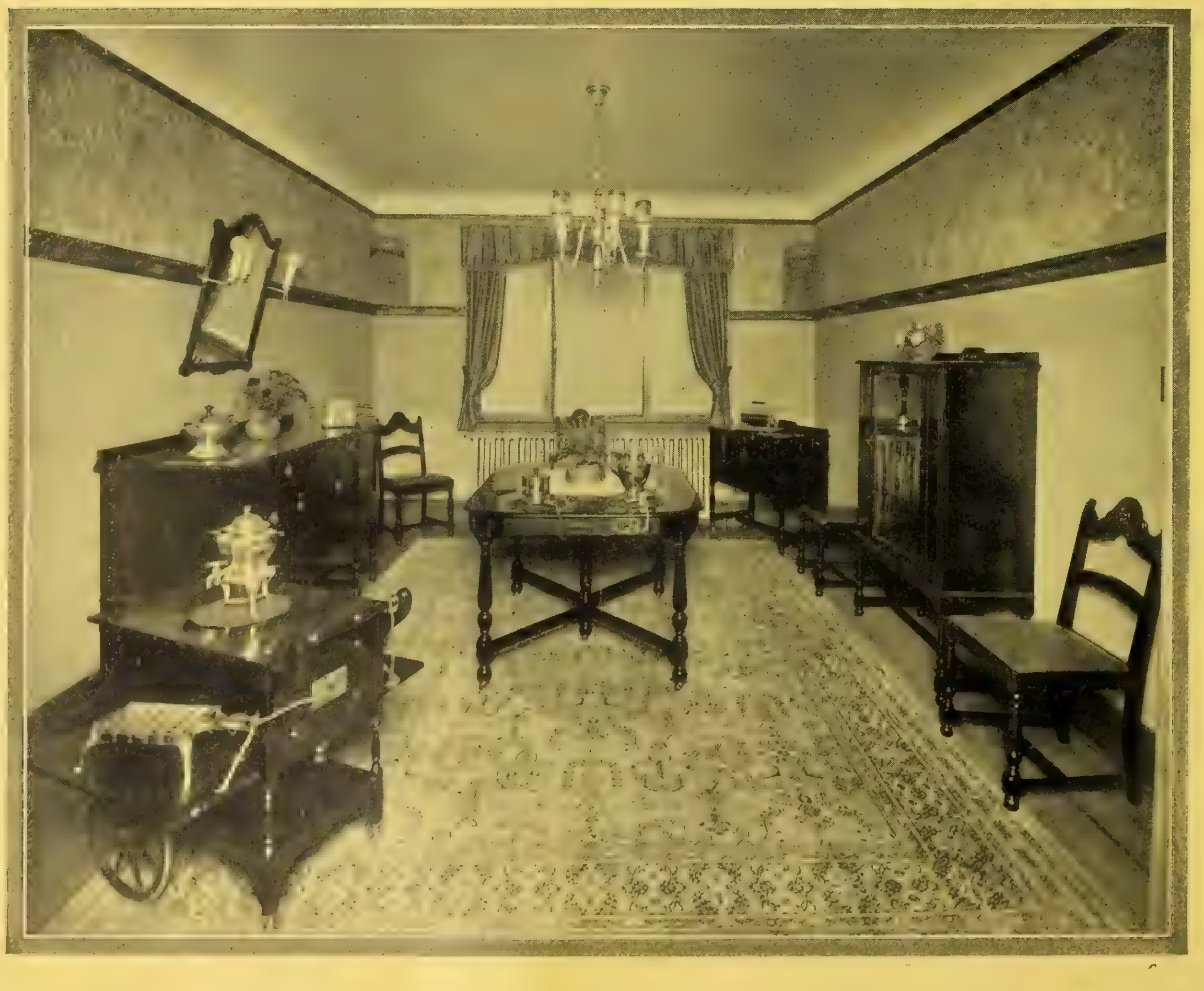
Among the large electrical enterprises in Canada, the name of the Mechanics Supply Co., Limited, Quebec, occupies a prominent place, and their extensive premises in the wholesale business district of that city has become a well recognized centre for the distribution of everything pertaining to the electrical and mechanical arts. In our Nov. 15 issue we drew the attention of our readers to this large organization which Mr. W. H. Wiggs, its president, has built up since the year 1889 when he first established this business in his native city.



Appliance Show Room of the Winnipeg Hydro-electric System



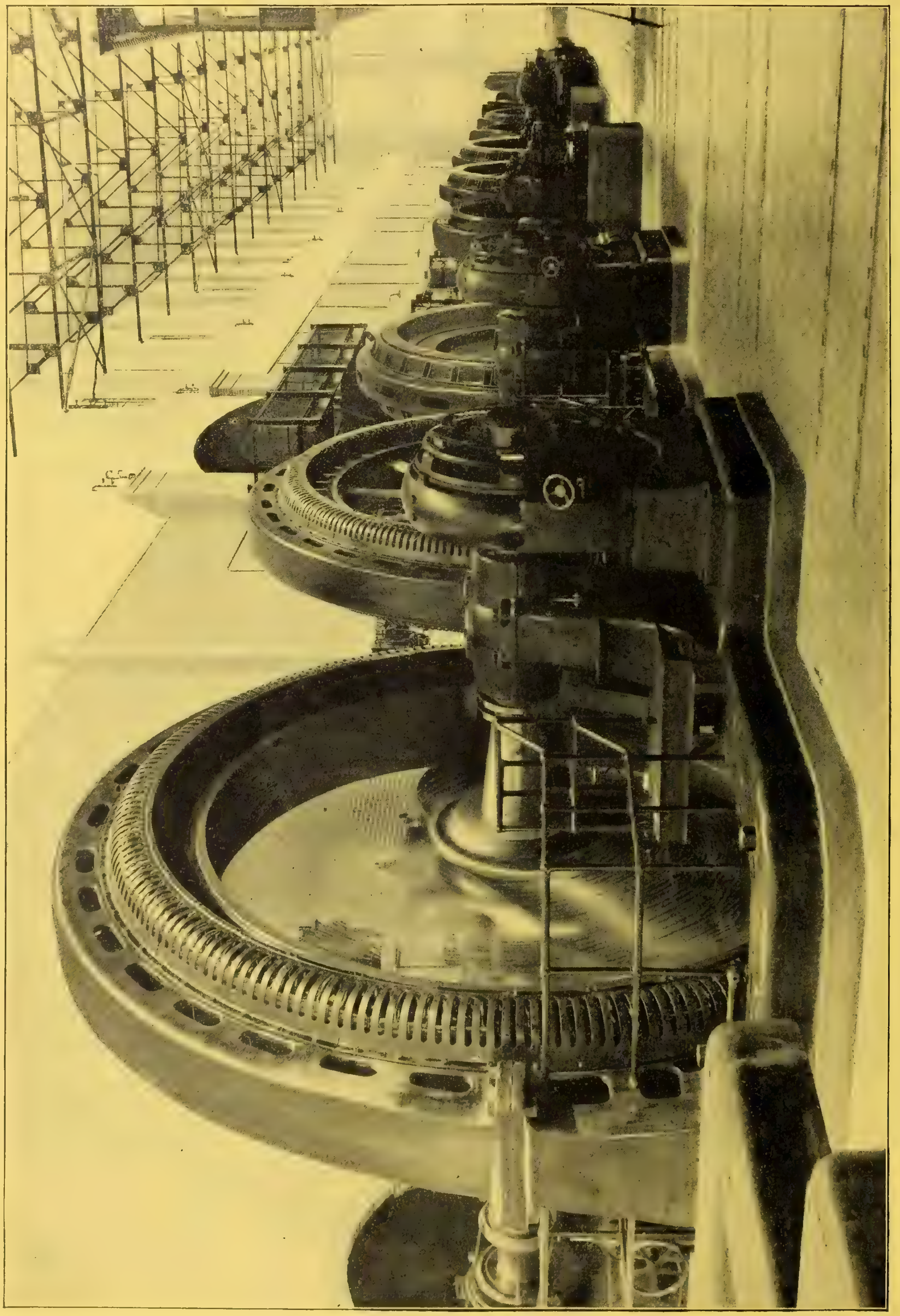
These attractive offices and show rooms of the Toronto Hydro-electric System are situated in the new Public Utilities
appliances. The underlying idea in opening this show room is to



The Electrical Co-operative Association of the Province of Quebec recently held an Electric Home Exhibit, which was attended by 30,000 interested citizens. Two views of this home are shown herewith. Note the wiring of the furniture.

Building at the corner of Yonge and Front streets. Attractive surroundings enhance the appearance of electrical demonstrate the value of electrical appliances, rather than to sell them

On the left observe the wiring of the dining room table, and the afternoon tea table. On the right the bed is equipped with a duplex outlet. Base and wall outlets in sufficient number were also installed in this home, in all the rooms.



A fine view of the Generating Station of the Winnipeg Hydro-electric System at Point du Bois on the Winnipeg River

Expert Jeweler Explains To Electrical Dealers

Elementary Principles of Merchandising

Gordon McLaren of Hamilton, President of the Canadian Jewelers' Association, Tells Electrical Merchants how to Carry on at a Profit

It seems to me that there is quite a similarity between the electrical business and the jewellery business, inasmuch as the mechanical phase of it is an important factor in each instance. We have in our business watchmakers. They are mechanical men; they do not understand merchandising. They may start in business for themselves with a small stock, but generally speaking, they are not merchants, and know nothing about the running of a business. You likewise have mechanics who are working on your contracts; they are not merchants and are ignorant of business principles.

If you, a contractor-dealer, leave the store, to close a contract, perhaps your mechanics may, in your absence, pick up various items that they need on their jobs, without leaving any record. This will result in serious shortages and upset your calculations. The plan we have in our own store is to have every article on the premises numbered. Each item is recorded in our stock book. We use a sales-slip, and nothing is allowed to leave the store without being recorded on the slip, of which a duplicate is kept. Each morning a young woman checks up the transactions of the previous day and fills in the records and we are thus provided with what amounts to a perpetual inventory. At the end of each month, we receive a report from the auditor on each department, showing how the stock at the first of the month, the goods bought during the month, what is left on hand, and the gross profit.

Repair Department a Necessary Evil

In our business, we regard the repair department as a necessary evil. There is no money in it. The watchmaker will spend perhaps half an hour talking about some repair to a watch or a piece of jewellery, and will leave a good prospective customer for new business standing waiting in the meanwhile. Perhaps you are up against something of the same kind in your line. Certainly you cannot overlook the importance of service in this connection. People expect to go into a retail electric store and have you tell them right away what is the matter with their sweeper. Of course you can put it up to the manufacturer, but your customer won't want to wait. She's ready to clean house. You're the man she bought the machine from and you're the man she wants to fix it—and that without delay. With us, it is quite possible in the matter of a 50 cent repair job, on which we don't make anything anyway, to give some causes for dissatisfaction which will drive away an excellent prospective purchaser of our merchandise and prevent him, or her, from ever entering the store again.

Service

"Service" is a very large subject in itself and this, combined with "stock-keeping" is mainly what I would have you consider with me today. These two branches are very closely connected, as service in the strict sense of the term cannot be successfully given unless backed up by proper stock-keeping.

Straightforward dealing with your customers even to the amount of a penny is essential for three reasons. First—because it is the right thing to do. Second—because your business cannot successfully function and continue without it. Third—because you can't possibly be associated with your staff day after day without them absorbing the principles and practices by which you run your business.

You are an example to your staff. If bad, their training will be bad and before long will react on you. If the example be good you will at once command the respect of your staff and they will endeavor to emulate it and here, right at the start, you have the confidence and co-operation of your force, be it few or many. Without this confidence and co-operation your business is handicapped as you are endeavoring to pull the whole load single handed against opposition.

Keep in touch with your staff. Be friendly, but not familiar. Make them feel free to discuss an idea for improvement, or pass an opinion on something that is not in best interests of progress in your system or store management.

Keep Close to Your Staff

These are things that make the employer respected by the staff, not simply because of your superior knowledge of things in general. You can't know it all or keep your fingers on all the requirements and details of the business. Be interested in suggestions from your staff. They may not always be as good as your own, but at least they show an effort to help. The staff will have the solution of a problem before you even recognize that a problem exists. Shift your responsibility when and wherever you can. Make your staff self dependent. Make them feel that they are an important link in your organization and that if they fail in their obligations the whole business system feels the effect.

Smile, if it hurts every muscle in your face

The Value of a Smile

In receiving your prospective buyer or customer, first Smile—smile if it hurts every muscle in your face. Don't giggle or laugh, just smile and make a mental note of how many smiles you will receive in return. This is the most valuable asset by way of an introduction that you can possibly possess.

Now you and your client are at ease and ready to talk business. Of course some people never smile back. Most of them do. Try it and see.

Next, be all interest and attention to hear your customer's request and endeavor to "get it" the first time without asking them to repeat.

Keep Stock Clean and Bright

Stock that is kept clean and bright and in saleable condition is just as apt to sell as some new pieces a week old. Go over your stock systematically so that it is always in shape for inspection. This also will hide the age of some of the pieces on your shelves for if they are bright and shining you will be the only one who knows how many birthdays they have celebrated.

Am I justified in emphasizing stock—in other words emphasizing old stock? Emphatically yes. Who said it was old? Only you or your clerks, as I said before, who have been associated with it until you have tired of it.

Don't Urge Your Own Preference

Quality and value are what you as a merchant must give your clients. Design? Style? Most people have, or like to feel they have, the power to make a decision on their own account and I would warn you who are salesmen to not be over-zealous in persisting to give prominence to the articles in stock which yourself would choose. In most cases your opinion would not be appreciated and you would likely lose a sale. If you are clever and impressive enough to make the sale, there will in all probability be a comeback, or worse still a dissatisfied customer who feels he was sold something he did not really like and who vows he will never go near that store again.

On the other hand you must not be too reserved and stingy with advice. If your client desires assistance and suggestion, give it freely but discreetly. Watch every expression on your customer's face. Note the frequency with which he refers to, or asks questions regarding, one particular article. Follow the trend of his thoughts as nearly as possible.

Be all intent on the finding of a suitable article for this particular person, no matter how many or how few the dollars involved.

No Trouble to Show Goods

Believe, from the time you approach your customer, that he has come in to buy. Don't worry too much about the results of your efforts to close a sale and get the money, important as it may be, thus forgetting your treatment, courtesy and effort, which will go a long way in making an impression. This impression will in all probability remain uppermost in your customer's mind, even while inspecting competing stocks. Prove your ability to live up to the much hackneyed phrase "no trouble to show goods" especially if you advertise it. Send your customer out of your store with a pleasant "good-day" and an invitation to return. Have him leave with a good taste in his mouth and the assurance that you have expended your best efforts to serve him.

I am dwelling upon this, because I believe it is just where most of us fall down in our service. You know people don't **have** to come into your store or mine, unless we make it as easy as possible and as pleasant as possible for them to obtain the information they seek. If you are feeling bilious, endeavor to hide it. If you are worried don't show it in your expression or demeanor. It is in accord with human nature for prospective customers to be susceptible, if the proper sort of treatment is tendered them. It is equally in accord with human nature for them to be reserved and disinterested in you and your goods, if you are not courteous, civil, painstaking and zealous in your efforts to supply the information desired.

Questions

Following Mr. McLaren's address, a number of questions were asked.

Question: If a fellow comes into your store on a Saturday night looking for a battery for his flashlight. You hand him the battery and when he slips it into the case it doesn't light up right off the bat. He then expects you to stand and make whatever little adjustments are necessary, while a number of other customers are waiting to be served. How would you handle a situation like that?

Answer: We are all up against propositions like that. In our case, for instance, the largest crowd of the day may happen to gather in the store around noon time, when 50 per cent of our staff are out having luncheon. And when fellows come in like that at the last minute of the twelfth hour on Saturday night, you simply can't give all the service that is demanded. The best you can do is to try and avoid offending anyone and wait on three customers at once.

Fixed Prices?

Question: Are there fixed prices in the jewelery business, and if so what is the percentage of profit?

Answer: At present, Mr. Raney, the attorney-general, is advocating the abolition of fixed prices, while the executive of our association is going on record as approving of fixed prices. We have appealed to Mr. Raney by letter, and at the same time we are going to make a personal appeal. At our last executive meeting, the matter came up of a store in which "Big Bens" were being sold at half price. Letters were read from a number of manufacturers in competing lines and retailers, who had communicated with the "Big Ben" people and had been unable to get any satisfaction. The contention is, on the manufacturer's part, that if he fixes prices it will interfere with the volume of business he can do. Druggests, hardware merchants and others, are handling such lines as "Big Bens" merely as a bait to get people into their premises and without figuring any profit on them. Again, the wholesalers in many instances are against the fixed price. One large wholesaler stated recently that his overhead had increased to such an extent that the mark-up allowed by the manufacturers did not provide a sufficient margin of profit. They therefore want to be allowed to ask what price they like.

I WANT THAT CLEANER FIXED AT ONCE, PLEASE!

Service is a very large subject

Overhead Percentage

Question: Have you compiled figures on overhead in the merchandising of jewelery?

Answer: The best authority on the matter is the Burean of Business Research of Harvard University. They have made an investigation for several years and worked out averages covering a number of stores. For 1919, the average percentage of selling expense on gross sales was placed at 32.7; in 1920, 37.5 per cent; 1921, 39.4 per cent. Overhead has increased considerably and business has slackened since the war. I believe that this year the figure will be somewhere between the high and low marks. The average cost before the war ran somewhere between 32 and 34 per cent.

Let's Walk 'round by Tim Jones' Store!

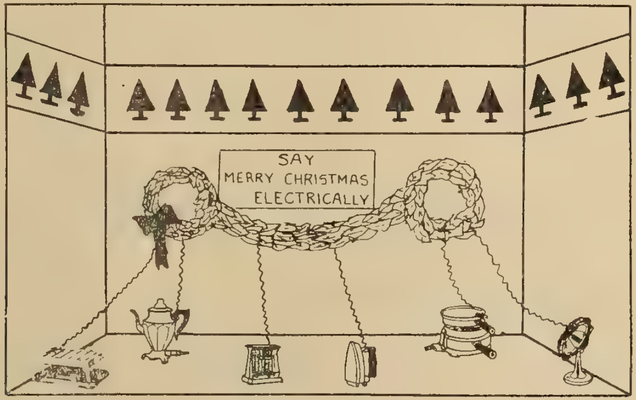
He Changes His Window Every Week and I Want to See It—I Think Mary Would Like Something Electrical for Christmas

"A two fisted grab for trade in the next few days will make a sick business sit up and look as perky as a bantam rooster." This is the way one dealer, a wide awake merchandiser—expressed himself to Electrical News. "The show window is a powerful aid; rightly handled, it is the big stick that clubs business into your store. The bulk of Christmas money is spent in retail stores that make an extra bid for it by dressing up their windows in an attractive way. And that is the reason electrical dealers should be asking themselves—What am I going to put in that window to get the most business?"

A Special List

A retailer will look over his stock and make a list out of those things that seem most appropriate as Christmas gifts. So far, so good. The next thing is to get these goods into the window in an effective way. This arrangement in the window must be such that it will:

(1) Attract attention.
(2) Create lasting impression.
(3). Pull observer to desire goods.



One of the easiest to set up

Taking these things up in the order named, a "Christmassy" appearance is going to attract more attention to the window than anything else. Here is a list of things handy in giving it that air:

Holly
Tinsel
Bells
Small Christmas trees
Small Santa Claus figures or cutouts
Artificial Snow
Sparkling ornaments
Small fireplace with stockings

Scores of different designs can be built with such accessories. It may be mentioned here in connection with point No. 1, that good lighting is necessary to attract attention. Use a moving display if you can. People stop to look at that and linger to study the other things in the window.

A Lasting Impression

The creation of a lasting impression is the real punch of a window display. If Mr. Passerby can look in that window and get an impression that stays with him till he comes that way again, the window is a winner. There is one best way to create this impression—**action** and don't over crowd Too many things in it leave a jumble of impressions, instead of a clear-cut idea.

Action in an electrical display is essential because we sell these goods, not for ornaments, but for what they will do.

Creating in an observer the desire for goods is a quality injected in several ways. The general appearance of course helps, the arrangement, lighting and so on, but there are several other little things that work well.

18 Feet Frontage

Take the concrete case of a dealer on a fairly lively business street. Suppose he has about 18 feet frontage, including a doorway in the centre. His windows are small, and he has to make the best of them; naturally he wonders how he is going to make an effective dis play. Here is one way he can do it:

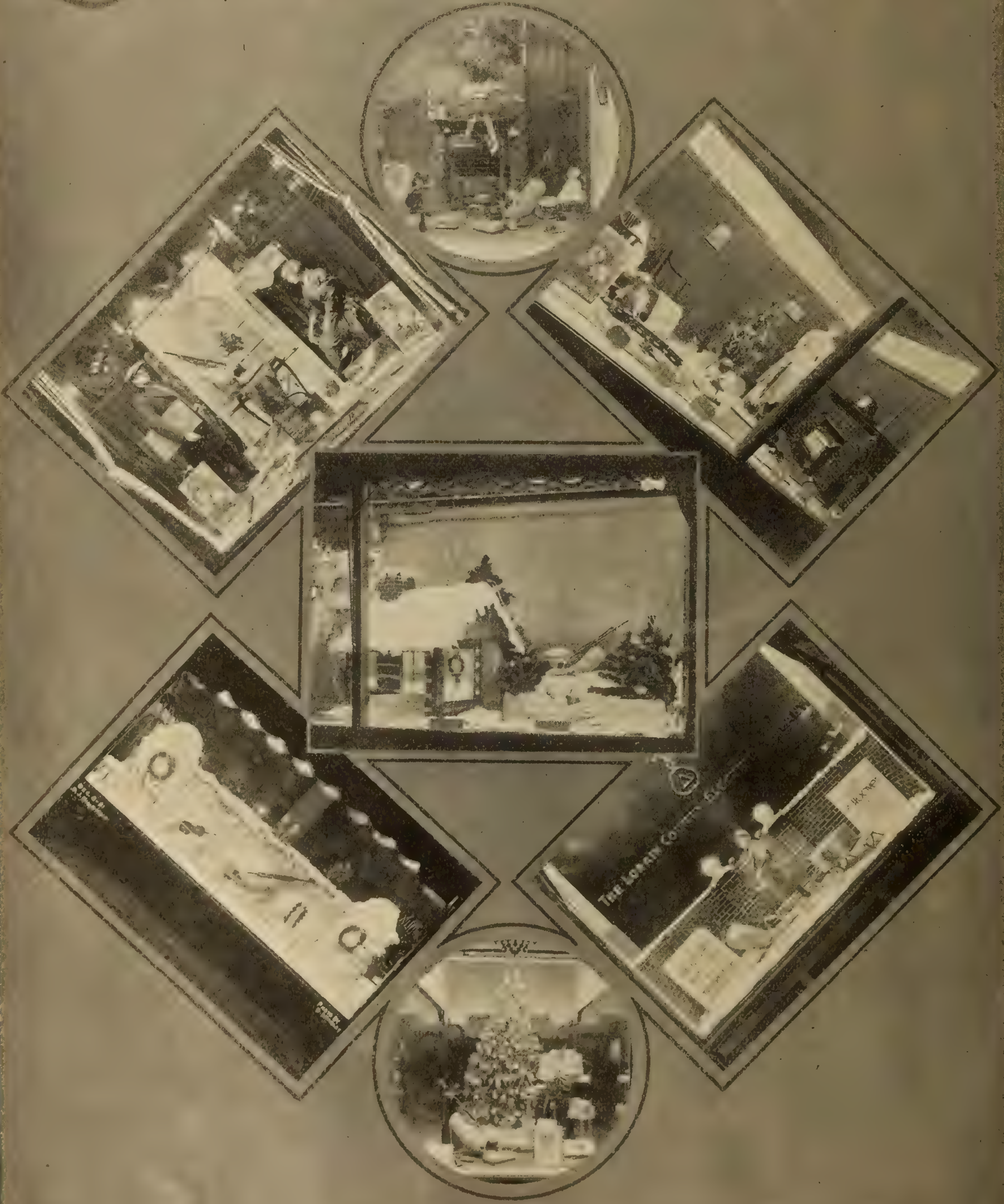
Put a small Christmas tree in the corner next the wall. Trim it up well with tinsel, etc. Have an electric train in front of the tree with a track properly laid out. A card might be attached bearing the words "For That Good Boy." To balance the tree, arrange a vacuum cleaner on the right hand side of the window. This also should bear an appropriate card. Small, daintily wrapped packages should be attached to the tree each bearing cards with Christmas greetings, addressed to some member of a family. Articles such as radio set, electric iron or grill, can be grouped around the bottom of the tree.

In the other window a large bell or Santa Claus head can be set at the back centre and tinsel run to a floor lamp, portable lamp, percolator and so on, grouped nicely in the window and bearing gift cards with holly decorations.

For A Large Window

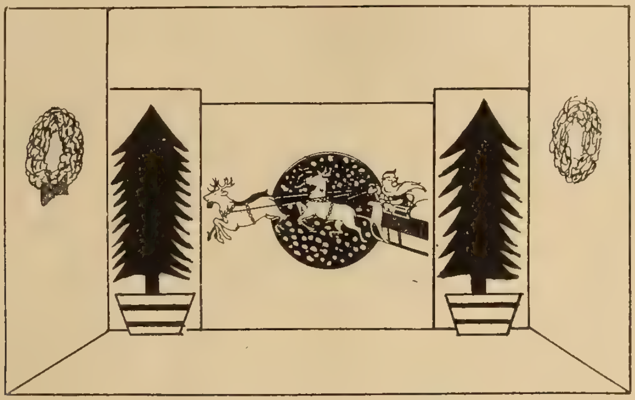
Another plan for a store with one large window, where the owner feels that he is justified in giving a reasonable amount of attention to the display, consists in dressing up the whole window to represent the scene in a well-to-do

Suggestions for Christmas Window Displays



home on Christmas morning. The background has to be well built up and curtains are hung to suggest the walls of a room. A fireplace occupies the left side of the window and a Christmas tree the right hand side. A table is placed in the centre, and groupings of various electrical gifts are arranged about. A wax figure may be used to advantage, The setting is somewhat elaborate but the man whose establishment enables him to carry it out will be well repaid.

One dealer with a very small window solved the problem last year by taking up nearly the whole background with a fireplace, painted on canvas. An electric grate was set in an opening cut in the canvas and a painted board made a nice appearing mantle. Well-filled stockings were hung from the mantel, and a small tree was set on a low table to the left of the fireplace. In this case he was able to use almost all the window space for gift display, with of course, holly and other trimming.


Not hard to make this background

For the dealer who feels he has to put in the simplest possible display, the cedar wreath idea is good. Put a large green wreath in the background, with a good card in the centre bearing the words "Make This An Electrical Christmas."' Run green streamers to various articles in the window. Other decorations should be added where necessary to balance the display, such as holly sprigs and bells or tinsel.

Price Tickets Desirable

The principle of putting prices on goods seems to be well-established. One successful window dresser claims that it the most necessary element for this sort of display. He explains a plan whereby it was possible to combine the gift suggestion idea with a price tag as follows:

"I have found it a good plan to stick several small cards right up on the glass of the window. These are so placed as not to obstruct the window view to any extent and each one bears the words "For Mother," "For Father," "For Sister," and so on. From each one card run a small streamer to the article mentioned. You will find, to avoid confusion, that the grouping will evolve into a more or less circular form. Now put a small but clear price tag on each article, and you have a window that does not fail to attract attention."

Location and Novelties

Location has a great deal to do with the window display. The store that has a constant stream of people passing in front of it is in a good position to handle novelties, that net a nice profit in themselves, and at the same time set off the electrical goods. Small vases, art pottery, candlesticks and such things are great helps in window dressing, but their selection requires great care if their sale is to prove profitable.

"If I had not a Christmas window in now, you can bet your boots it would be in before I went to bed-to-night" said a prominent retailer yesterday—"And I tell you my window looks pretty nice, doesn't it? Well, I am going to change it again before Christmas, to keep it looking fresh. You've got to do it if you want business."

The General Effect

The general effect of everybody boosting for Christmas business with special windows is to start the public thinking about electrical gifts—the effect is similar to the community drives for various purposes—It is another case where united effort will bring results.

The windows illustrated on the accompanying page of suggestions were some very fine Hoover displays used a year ago. The decorative ideas underlying these displays are applicable to any other electrical appliances, however, and we reproduce them in the hope that our dealer readers will get some inspiration from them.

When Phoning Your Customers

Here are some pointers on talking to your customers over the phone. They are definite facts that have been discovered by a retailer who went out to get results by this method.

Right time to phone—9 a.m. to 1.30 p.m.
Best hour of day—10 a.m. to 11 a.m.
Number of calls for best results—one a month per customer.
Concentrate your message.
Injection of personality almost indispensable.
Messages should be very carefully prepared, and not left to haphazard judgment.
Avoid any "parrot" tendency.
If possible have women call women.
Evening calls little use.
For best results same man should not call more than 10 to 15 times a day.

Conditions vary in different localities, but the above is a proximate guide. Your phone represents an investment that can be made to pay dividends.

The Lenk Manufacturing Company, Boston, Mass., manufacturers of soldering outfits, lineman solder, blow torches, etc., have announced the appointment of the Smith-Stewart Company, London Law Building, London, Ont., as their Dominion representatives to handle their entire line.

Mr. John Herget, treasurer of the Century Electric Company since 1904 and close associate of all those active in its affairs died on November 14 after a very brief illness.

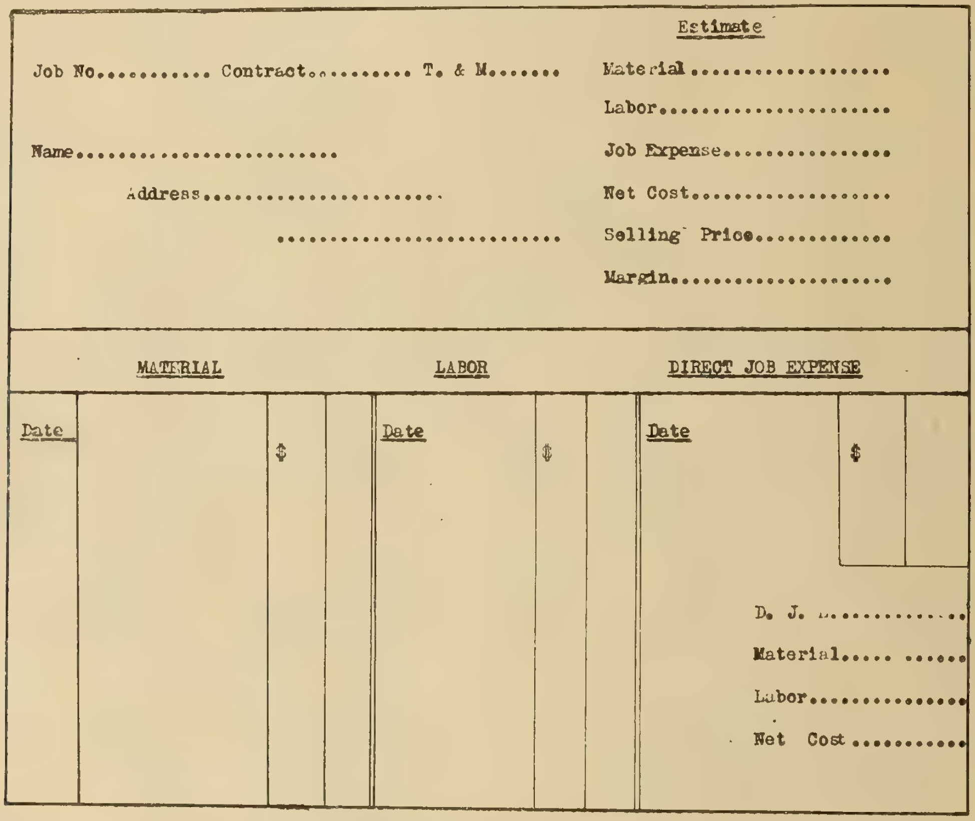
Weaning the "Shingle" Estimator From His Evil Ways

By REY E. CHATFIELD,
Secretary-manager, Electrical Co-operative League of British Columbia

The improvement of the status of electrical contracting is an end desirable from every point of view. This improvement can be accomplished only by starting with a good foundation and this foundation, to my mind, lies in having a proper costing of all jobs.

The contents of the following bulletin shows an easy way of getting at the fundamentals of costing a job. We all know of the controversies there are about estimating, still it is not uncommon to hear remarks like the following:

> **"I have been in the electrical business fifteen years and you can't tell me how to price a job or how to figure it, but how the deuce can I tell what I make on a job when I have finished it. Generally I figure upon a piece of paper or a shingle how long I took on the job and about how much material I used and, if the price is larger than the cost I throw away the shingle."**



Estimate

Job No.......... Contract.......... T. & M.......

Material....................

Labor....................

Name........................

Job Expense...............

Address......................

Net Cost...................

....

Selling Price............

Margin...................

MATERIAL — LABOR — DIRECT JOB EXPENSE

Date		$		Date	$		Date	$	

D. J. ....

Material...........

Labor...............

Net Cost...........

I have heard the above remark so many times that I believe the best way to answer it is through this bulletin. Every job a contractor takes involves the use of three factors, viz.,—material, labor and expense. Hence the easiest way to ascertain the cost of a job is to segregate these items. I make the suggestion that an envelope be ruled like the form above and used for the purpose of costing jobs.

Each job should be given a number as a means of identification, for example,—

Job No. 1.
Name: John Doe,
Address: 840 Howe Street.

A check mark in the space "Contract" or "T. & M." denotes whether the job is contract or time and material. The details of the estimate are entered in the upper right hand corner. This serves two purposes: it gives the contractor an opportunity to check the accuracy of his estimating when a job is complete and also to check progress as the job is going on.

In the three columns "Material," "Labor" and "Direct Job Expense" are entered, the items which make up the cost of a job under those various sub-divisions.

"Material" is material actually used on the job.

"Labor" is time actually used on the job.

"Direct Job Expense" includes car fares, telephone charges, cartage, permit and inspection charges, etc.

Lists of materials and time cards are filed inside the envelope upon the completion of the job.

You will note the word "Margin" as designating the difference between the Selling Price and Net Cost.

To determine the **ACTUAL PROFIT**—Assume the cost of doing business for YOU is,—say 25%—it may be more or it may be less—**You should know**—Take 25% of the selling price and deduct that amount from the Margin and the remainder is your **Actual Profit.**

A 100 Per Cent Interesting Program at Meetings of Calgary Contractor-Dealers

At a meeting of the Calgary Ass'n. of Electrical Contractor-Dealers held on Oct. 26th, a membership committee and program committee were picked from the members present. The membership committee was made up of the following:—R. A. Brotherston Brotherston Electric Co.; J. Cassidy, Crane Electric Co.; W. Hudgings, Howden & Hudgings. It is the duty of this committee to see that all members are at the meetings or report reason for their non-attendance. With this wide awake committee the members are looking for one hundred percent attendance.

The program committee includes the following:—E. M. Duncan, sales manager, Northern Electric Co. Ltd.; Guy Morton, Electrical Engineers, Limited; E. Beard, Budden Beard & Co. Ltd. This committee intend having each member, as well as the non-members, give a twenty minute talk on Electrical Business as it affects Calgary contractor-dealers. A different speaker will be chosen for each meeting.

Guy Budden of Budden, Beard & Company, gave a very fine talk on Retailing and Contracting. He impressed the local dealers and contractors with the idea of knowing their costs, their overhead and the profit they desired. Knowing these facts thoroughly, quote your selling price, forget your competitor and you will be assured of success. Guy is right.

Another Meeting on Nov 9

A regular meeting of the Calgary Association of Electrical Contractor-Dealers was held on Nov. 9. A large number of the members were on hand and when the usual business had been attended to they listened to a fine talk on "Organization" by Mr. E. M. Duncan, sales manager of the Northern Electric Company, Limited. Mr. Duncan carried his listeners back a few hundred years and compared business methods of ancient date with those of the present. Commercial business is only made possible by "Desire"—desire to sell and desire to buy.

Business is only successful so long as we give one hundred cents value for every dollar received. Give and receive dollar for dollar, allowing only that fair margin of profit.

If you estimate an article to be worth five dollars and twenty cents, why cut off the twenty cents even though your competitor might do so; you can't afford to, so why worry about him.

"The constitution of our Association, I believe, means an end to half the troubles encountered in the past as it opens up opportunities of teaching and learning; opportunities to study more closely our fellow man and to know his business troubles and to satisfy ourselves that he sympathizes with us in ours. The natural result will be that the business will be placed on a sounder and more profitable basis, because of that sympathetic understanding one with the other. We have standardizations to respect but price is not one of them. Nothing will more quickly build up a good healthy trade than good honest competition. Regarding prices, the other fellow will be entirely satisfied if he knows that you understand—and act according to your understanding—that no matter what you do to build up a profitable bussiness, most of it will be wasted effort unless you are working from known facts of today's costs of good and today's cost of doing business."

Extensions by Suburban Rapid Transit Co

The Suburban Rapid Transit Co., a subsidiary company of the Winnipeg Electric Railway Co., have made rapid progress on the extension of the pole line in the municipality of Charleswood. General construction work has been completed in wards 1, 3, & 4 and residences in these wards are now being served. The first customer was connected on Oct. 7th.

Tell me not in smiling numbers
Selling costs are what they seem,
And the man who cuts for orders
Gets the lion's share of cream.

If you strive to build a business,
Do not be a human sieve,
Letting leak your needed profit,
Trusting luck will let you live.

Lives of "Dead Ones" all remind us
What it means to sell on guess—
Their departing makes us keener
To sell RIGHT and not sell LESS.

Get your costs as low as may be,
Let your profit be what's fair;
Then will men know where to find you
And will help to keep you there.

For no Trade can long be loyal
To a man who's "all regrets"—
Can't deliver—who's just living
On the interest of his debts.

Live and laugh and work and prosper,
Know your costs and sell at gain;
And continue doing business
When price"busters" split in twain.
Trumbull Cheer.

A Western Electrical Home

Much interest was shown by prospective house builders in the Electrical Home which was recently shown at 1550 Twenty-ninth Avenue, Vancouver, by the Electrical Service League of B.C. The house was loaned for the occasion by the contractors who built it.

All told, many thousands visited the home. In the evening there was especially large crowds attracted by the ideal illumination. The house was flood-lighted at night and could be seen for a considerable distance.

Visitors were met at the door and the various points of interest explained to them. On the closet doors there were automatic switches, while around the baseboards of the rooms there were some 43 outlets for attaching lamps and appliances. The women were shown the beauties of an electrical kitchen and laundry.

The house was shown by a volunteer staff of 13 men to a shift. In all 116 electrical men of the city served on the house committee, and every man in the industry co-operated. Among the captains of the various shifts were the following: J. R. Real, local manager, Westinghouse Company; J. F. Little, local manager, Northern Electric Company; H. Pim, local manager, Canadian General Electric Company; W. C. Mainwaring sales manager, Northern Electric Company, S. Smith, assistant manager, Canadian General Electric Company; E. E. Walker, sales engineer, B.C. Electric Company; E. Brettell, W. N. Fraser, C. C. Carter, P. F. Letts, P. Farr, S. E. Jarvis, D. Ormsby, George Horsman, Harry Stephenson and H. V. Rankin. J. Lightbody was chairman of the house committee, and R. E. Chatfield, secretary-manager of the Electric Service League, manager of the home.

In a bulletin issued by the B.C.E.R.Co., it is stated that there are about 130,000 persons carried per day in Vancouver city, with 50 per cent more on holidays, or other big days.

The Question of Manufacturer Guaranteeing His Products Discussed at Fortnightly Luncheon of Manitoba Electrical Association

At the fortnightly luncheon of the Manitoba Electrical Association held at the Fort Garry Hotel, Winnipeg, on Thursday the 16th November, the subject of "Guarantees" was discussed.

The discussion was led by L. M. Cochrane, who wanted to know whether guarantees are justified from the standpoint of the electrical manufacturer, jobber and retailer. Today nearly every electrical appliance is guaranteed, and has a guarantee tag attached to it, therefore the public expect it. It is not so in other lines, such as automobiles, jewelery, and furniture; the only guarantee you have is the good standing of that dealer; the product has no written guarantee. You buy a phonograph at any price from, say, $50.00 to $500.00. Do you get a guarantee Certainly not. Then why should the public expect to get a guarantee on a four or five dollar appliance. What is the idea of a guarantee The public seem to think it is something given away free. There is no doubt that it keeps prices up, as the manufacturers have to set aside a certain amount for replacement. We have taught the public to ask for guarantees. The goods that should be guaranteed are only those bought in second hand stores. Dealers should be able to give service on repairs instead of replacing.

J. E. Lowry, president of the association, said that too much was expected of the manufacturer, he was practically called upon to guarantee against wear and tear. George Wright, manager of the C.G.E., wanted to know how the dealer could determine whether a lamp had been used at right voltage, or an electric iron allowed to burn all night. Mr Wright stated that guarantees were started to introduce new lines, such as electric irons, to get the public to break away from the old fashioned flat iron. In his opinion the guarantee is a supporter of inferior appliances. If guarantees were removed it would establish a better standard with the manufacturer. The public are liable to burn a lamp 1000 hours, and then expect the dealer to replace it. Mr. Wright thought that guarantees could very easily be taken off electric irons, but perhaps not so with ranges, water heaters, and other appliances.

L. B. Dickson took a somewhat different view on the subject, he said that as long as manufacturers are ready to guarantee goods they will be supported by most dealers. Mr. Dickson does not believe in contradicting a customer over a small article such as a lamp. That customer may be a prospect for four or five hundred dollars worth of fixtures.

Mr. Dodds, of the Canada Dry Cells thought that the public in our community should be protected, as we make our bread and butter from them. One manufacturer some time ago turned out a range that was not perfect, but guaranteed it, and replaced about 60 or 70 in Winnipeg, thereby gaining the good will and confidence of the public.

Mr. Minty, of the Manitoba Telephone System said that it was not necessary to guarantee goods, as a reputable manufacturer will always stand behind his products.

Mr. Allen, of the Great West Electric Co. Ltd., said that manufacturers of inferior goods take advantage of guarantee tags. The automobile industry use the word "Warranted" instead of guarantee; the latter word seemed to be the cause of no end of trouble.

Morris E. Deering, felt that it was not necessary for any reputable manufacturer to guarantee his lines, as he will always stand behind his products. Very often jobber's representative will try and sell the dealer on service instead of merit. This is another disadvantage of the guarantee.

Prominent Electrical Contractor-Dealers

—2—

R. A. L. Gray, Eastern Canada Representative National Association of Electrical Contractors and Dealers

Mr. R. A. L. Gray, electrical engineer and contractor, Toronto, whose retail store at 85 York St., is one of the landmarks of the city, has been in business on his own for nearly twenty-four years. Mr. Gray started out in life with the idea of confining himself entirely to engineering work, entering the school of practical science in the early nineties. The lure of active business life was too much for him, however, and after two years at the university, we find him gathering practical experience with the Canadian General Electric Company, to be followed almost immediately by the formation of his own private business.

R. A. L. Gray

He is one of the best-known and most highly respected business men in Toronto and has an enviable reputation for knowing his costs, figuring his estimates on the basis of a fair profit and for standing out against price cutting. His motto may be summed up briefly as follows—Do business at a profit or not at all.

Mr. Gray is conscientiously and aggressively active in all association work. He claims that he finds it repays him in dividends, but his friends believe he would do it for the benefit of the industry in any case. For example, he is an active member of the Toronto Association of Contractor-Dealers, the Ontario Association of Contractor-Dealers, and is Eastern Canada representative on the National Association of Electrical Contractors & Dealers, with which the Canadian associations are affiliated.

Taken by and large, it would scarcely be possible to find an electrical man of whom the electrical industry in Canada has greater reason to be proud.

Instructions For The Dealer to Pass on to the Radio Beginner*

The antenna need consist of only one wire having a stretch of from 75 to 150 feet, the longer stretch being preferable. Procure some antenna wire consisting of a stranded cable of phosphor-bronze, select two convenient points, a suitable distance apart and as high as possible, between which the antenna is to be stretched. This stretch should be clear from all surrounding objects and at least 20 to 25 feet high. Antenna insulators may be made from scrap fibre by cutting a piece six inches long by one inch wide and 3/15 to ¼ of an inch in thickness. Bore a small hole in each end of insulator, and place one on each end of antenna wire, fastening a supporting wire onto the free end of each insulator and tying same onto the most convenient place. Where one lives in town it is often difficult to secure a proper location for an antenna often necessitating the erection of a pole on the house top and back yard. The most efficient antenna will be one that is long enough, high and free from surrounding objects.

Having decided on a location for your radio set, it will be necessary to secure a wire connection to the antenna and ground. To bring the antenna and ground wires into the building it is necessary to bore holes through sill into which porcelain insulators may be inserted through which the wires are run. In order not to interfere with the sash cords these holes should be placed either at the top or bottom of the sill. A lightning arrestor, ground pipe clamp, No. 14 rubber covered wire and porcelain knobs are needed to complete the installation.

Connect a lead-in wire, of the same size as used on antenna, on the antenna end nearest the instruments, and run same down to the lightning arrestor, which may be fastened outside the house right near the point of lead-in. The nearest water-pipe will provide a suitable ground connection. Its surface should be scraped clean at the point of fastening of the ground clamp. Then the No. 14 rubber covered wire may be connected to the ground clamp and run on porcelain insulators up the side of the house to the other end of the lightning arrestor. Two insulated wires, one on each side of the lightning arrestor, corresponding to antenna and ground connections should be led into the house through the porcelain tubes provided. These two wires are to be connected on the antenna and ground posts of the receiving set.

We are now ready to operate the set which we will assume of the construction decribed in a previous issue. Having connected the headphones on to the binding posts marked "head-set", place same over the head, adjusting headband until the receiver caps fit tightly over the ears. A slight adjustment of the hair spring resting against the crystal of the crystal detector will be necessary until a sensitive spot is found. One cannot tell, however, whether a sensitive spot is reached unless a signal is heard.

After having tuned in a radio signal by varying the switch lever over the 10 taps, selecting the one that gives the best signals, the detector may be adjusted for maximum sensitivity by trying various points on the crystal until maximum signal strength is obtained. It will be noticed that the different classes of stations will all be heard on their respective taps on the switch lever due to the fact that each tap responds to signals of a given wave length.

It is not only possible to hear short distance radiophones with this set, but also amateurs and ship stations at a greater distance transmitting code messages. Of course, these messages are meaningless unless one masters the code.

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*From information supplied by S. W. Place, Radio Engineer, Diamond State Fibre Co.

Holland Builds Big Radio Plant

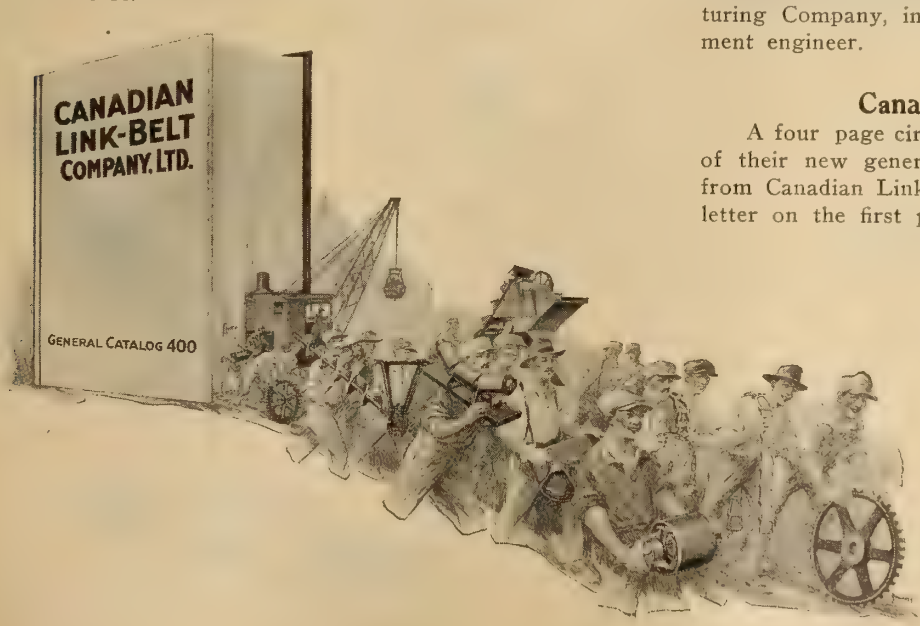
The Dutch Government is establishing a very powerful wireless sending and receiving station at Kootwyk, in the province of Gelderland, covering an area of 750 acres. Another station for receiving will be established 30 miles southward. Five masts, 700 feet high, have been erected at Kootwyk, weighing 100 tons each. The work is being directed and the materials supplied by the German Telefunken Company, and the station is expected to be ready for service at the end of the year. Kootwyk station will be equipped with a special duplex system to receive and send simultaneously to and from Java, 7,500 miles distant.

Announcement

The Signal Electric Manufacturing Company of Menominee, Michigan, has acquired the Hulbert patents and taken over the assets and liabilities of the Hulbert Electric Manufacturing Conmany of Chicago, Illinois. Under this arrangement production of the Hulbert battery charger will be increased and others of the Hulbert patents will be developed and put into production. Mr. C. H. Hulbert will hereafter be identified with the Signal Electric Manufacturing Company, in the capacity of research and development engineer.

Canadian Link-Belt Catalog

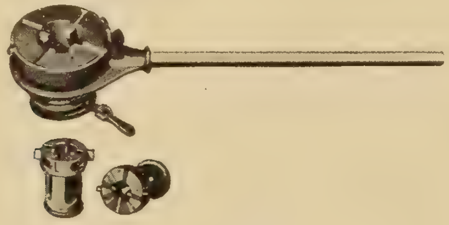
A four page circular letter, announcing the publication of their new general catalog, No. 400, has been received from Canadian Link-Belt Company. This circular carries a letter on the first page suggesting that engineers, superintendents and purchasing agents send for a copy, and provision is made on the last page for eight separate requests. The two inside pages are devoted to an illustration of the catalog, as shown herewith in miniature, and as this illustration is in colors, the effect is novel and striking. The idea of men walking out of a catalog carrying the actual articles illustrated in the book is something quite out of the ordinary. If you did not receive one of these circulars, address the Company, either in Toronto or Montreal.



The Latest Developments in Electrical Equipment

"Beaver" Ratchet

The Borden Company, Warren, Ohio, has placed on the market a ratchet for threading pipe ranging in size from ½ in. to 2 in. diameter. It is claimed that the No. 4 Beaver Ratchet is one of the easiest threading 2 in. die stocks manufactured—a spring balance scale registers only 28 pounds pull on 2 inch pipe.



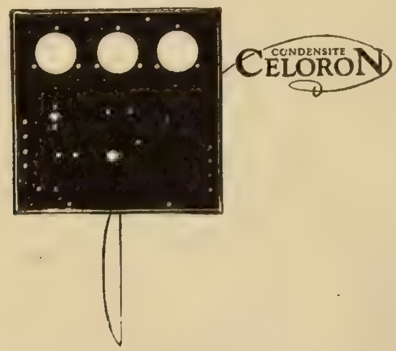
It is receding die stock, using narrow dies that ease the labor as the thread is cut. Separate dies and bushings are furnished for each size pipe.

Cable Bender

A tool for bending and forming cable in manholes, vaults or other cable installations has been placed on the market by T. J. Cope, 2112 Sansom St., Philadelphia, Pa. The device is made of forged steel with a steel tube extension handle. All sizes of cables from 500,000 c.m. to 2,000,000 c.m. are taken in by means of six adjustments. Dimensions are 26 in. closed, 34 in. with handle extended. Weight 12 lbs.

Shielded Panel Material

A condition with which all radio operators are familiar is the capacity effects of the operator's body in tuning. This phenomenon is a most annoying and troublesome impediment to expert operation.

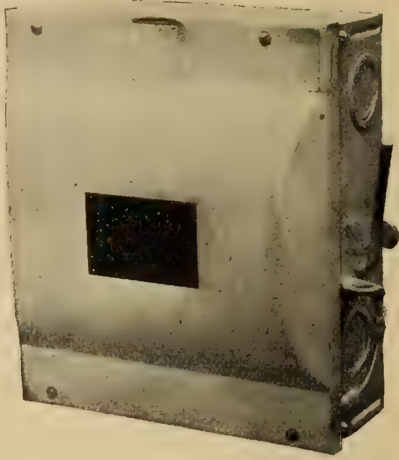


Supplied by Diamond State Fibre

To overcome this, there has been developed a shielded panel material. This important development consists of a special metal plate embedded just under the back surface of the panel. The outstanding feature of this construction is that it lowers body capacity and minimizes detuning effects.

A New Safety Range Switch

A new type of switch, specially designed for use with electric ranges, and known as the W-K Safety Range Switch, has recently been developed by the Westinghouse company. The special features of this switch are simplicity of construction, safety to the operator, and attractive appearance. It consists of a rugged knife switch, suitable for either two or three-wire 125/250 volt circuits, mounted in a steel cabinet and operated by an external handle. The cabinet is finished in baked white enamel, which is easily cleaned with a damp cloth. The cover of the cabinet is held in place by screws, so that no one can accidently come in contact with live parts. The handle may be locked in the "off" position if the operator so desires. Knock-outs, accommodating the different sizes of conduit, are provided in all sides and the back.



Ideal Christmas Presents

Left—Sunnysuds Washing Machine, Onward Mfg. Co. Below—Adjustable Lamp, W. H. Banfield & Sons

Current News and Notes

Brandon, Man.

Mr. J. B. Harvey, local manager, states that re-arrangement of their entire plant is being planned by the Canada Gas & Electric Corporation. The work will include the installation of new boilers and other machinery. It is reported that the company may improve their dam on the Little Saskatchewan River.

Calgary, Alberta

The local Association of Electrical Contractor-Dealers instructed the secretary to send a letter of condolence to R. S. Trowsdale, sales engineer of the local branch of the Canadian General Electric Company, Ltd., whose wife passed away on Monday October 30th,

The Brotherston Electric Company have been successful in securing the contract for wiring the Indian School at Gleichen, Alberta. This is one of the largest contracts of the year.

Howden & Hudgings have just completed the installation of nine electric ranges and water heaters in the Radio Apartment Block, Calgary. Tom Howden sure believes in "Do It Electrically."

Lloyd Orr has just completed a contract installing five electric ranges in a local apartment house.

A. P. Horner, manager of the Calgary branch of the Canadian General Electric Company, Ltd., has been disappointed at not receiving any orders from the South Territory for the past five weeks, but if he will only stop to consider that the salesman covering that territory, W. E. Thurman, married Miss O'Harris on October 20th, he will need no other reason. Give Ted a chance and he will come back to true form alright.

Cannington, Ont.

J. E. Cornfoot, Hydro superintendent for the past six years of Sunderland, Cannington & Woodville, Ont., has recently been presented with a new office, handling electrical appliances. He is a well known electrical man and is now very busy electrifying farms in and around his district.

Chesley, Ont.

It is stated that the hydro debt against the town of Chesley for difference in cost of power, as ascertained by annual adjustments, is $6,654.73. This is the accumulation of several years. The charge for depreciation fund is to be lowered from 5 to 1¾ per cent, and as this is to be retroactive for two years, and as a surplus is expected this year, the debt will be wiped out, it is expected, by the end of 1922. Hydro was installed in Chesley in June, 1916. The original cost of installation was $27,500 and with extensions which include two farmers' buildings near town, the present plant stands about $30,000.

Edmonton, Alta.

Bert L. Perry, Ltd., 10033-202nd Street, Edmonton, Alta., has recently been awarded the electrical contract in connection with the following buildings: Marshall's warehouse to cost $40,000; Strathcona hospital wing, $175,000; Eastwood school, $175,000 and Hudson Bay stores, $15,000.

Ford City, Ont.

An additional sum has been voted by the town council in a contract with the Northern Electric Company to supply an underground system in connection with the placing of the fire and police signal apparatus.

Fredericton, N. B.

Mr. C. O. Foss and J. D. P. Lewin, chief engineer and legal adviser, respectively, of the Hydro-electric Commission, recently appeared before the cabinet of the Provincial Government. They presented a proposed bill suggesting legislation that would create electrical districts so rural communities could more readily organize and take advantage of hydro power development.

Hamilton, Ont.

A full report on wires and poles was presented to a committee of the city council recently by E. R. Gray, city engineer. The report showed that the Dominion Power and Transmission Company had wires on 162 poles belonging to other companies and 226 poles of its own. The Bell Telephone Company had 101 poles in the restricted districa and the C. P. R. 51. The city fire department used 112 poles, of which 19 were its own. The G. N. W. used 154 and the Hydro 45. The estimated cost of putting the fire department wires under and installing new signal boxes was $16,000. If the old boxes were used the cost would be $9,000.

Mr. E. J. Sifton states that more heaters have been sold recently than during all the rest of the time the Hydro has been in business.

Hanna, Alta.

The town of Hanna, Alta., are erecting a new electric light and power plant, estimated cost for site, wells, coal siding, building and machinery $35,000. Re-building and extending pole line services, estimated cost $4,500. The Canadian General Electric Company, Calgary branch, were awarded the contract for the plant and pole line material; boilers by Canadian Allis Chalmers Co., and engine by Goldie McCulloch Co., of Galt, Ont.

Manitoulin Island, Ont.

An estimate of the cost of developing power at Kagawong Falls is to be prepared. This will be done by the firm of James, Proctor and Redfern, of Toronto.

Meaford, Ont.

The town of Meaford was recently in darkness because the Georgian Bay Milling and Power Company, which supplies electric power for the town, suspended business, and all electric power was cut off. The closing of the electric power plant meant the shutting down of the Steel Products plant, the Meaford creamery, the town newspapers, local printing offices and various other concerns. The trouble was remedied inside of 24 hours.

Niagara Falls, Ont.

Owing to the rapid increase in the power loads on the Niagara system, the Hydro-Electric Power Commission of Ontario has notified the municipalities and customers supplied from that system, that their power demands must not exceed their present demands until the installation of the fourth generator unit has been completed in the Queenston plant. The amount of power generated and purchased by the Commission at Niagara is now in excess of 525,000 h.p., approximately 183,000 h.p. of which is being supplied by the three generator units installed in the Queenston generating station. There has been an increase in the amount of power supplied on the Niagara system of over 100,000 h.p. since December, 1921.

Ottawa, Ont.

In a judgment given recently Judge Mulligan reversed the decision of the Court of Revision and decided that the Ottawa Electric Railway is not liable to be assessed for city business tax. The Court of Revision had upheld the city's right to collect business tax from the company and an appeal was taken by the O.E.R. to the county judge. Judge Mulligan sustained the appeal on the ground that the agreement entered into in 1893 between the city and company contemplated exemption from taxation now known as business tax.

The 1893 agreement states that the Ottawa Electric Railway was exempted from taxation and all other municipal rates on their franchises, tracks, rolling stock and other personal property. In 1904 the province created the business assessment under which any person or firm carrying on a tramway business or street railway business was subject to a business assessment equal to 25 per cent. of the assessed value of the land. The question at issue was whether this business tax imposed in 1904, affected the Ottawa Electric Railway.

Quebec, Que.

The exportation of power from Quebec to United States by the Montreal Public Service Corporation is foreshadowed in a bill which was given its first reading before the Legislative Assembly on November 17. The bill amends the charter of the Montreal Public Service Corporation, changing its name to that of "The Quebec New England Hydroelectric Corporation," and seeks to permit of the company doing business outside of the Province of Quebec. The petitioner is E. A. Robert, president of the company.

Queensville, Ont.

At the present time the village is without electric lighting, and an effort is being made to obtain power from Newmarket for this purpose.

St. John, N. B.

The recent election of G. Fred Fisher to the mayoralty of St. John was decided on a public ownership issue. His campaign platform calls for the completion and signing of a contract with the New Brunswick Electric Power Commission for hydro current and the appointment of an independent civic Hydro-electric Commission to construct a civic distribution plant; second, completion of plans and specifications for a civic distribution system; third, an offer of $2,577,655.56 to be made to the New Brunswick Power Company for its entire property, this sum to be the maximum and the offer to remain open ten days; fourth, in the event of the offer not being accepted by the power company the city to proceed immediately with the construction of its own distribution system.

Sudbury, Ont.

A. P. Kutchaw of Sudbury, Ont., a well known electrical contractor also plumbing and heating contractor, doing business in Sudbury for many years, has recently opened a fine store on Elm Street, Sudbury, dealing in electrical appliances, plumbing and heating.

Toronto, Ont.

Tomlinson and Forbes, 29 Duke Street, Toronto, are discontinuing the sale of radio parts to dealers and will place their equipment in future through jobbers only. They have now opened an electrical department specializing in re-winding motors and generators.

West Vancouver, B. C.

A by-law embodying important provisions in regard to the supply of light, power and railway service to West Vancouver was recently passed by a large majority. Under this agreement the company will have the right to continue to collect the six cent fare, but in return will undertake certain paving work, will grant a reduction from six to five cents in the lighting rate, will establish motor bus lines in the outlying portions of the city, and will make other concessions to the city. The concessions granted by the company, it was estimated by City Engineer Fellowes, would entail an expenditure by the company of approximately $800,000, in one item alone, that of replacing overhead wires with underground cables, the company agreeing to spend the sum of $250,000 during the next five years. The agreement will remain in force for five years, and before that period expires provision is made for appointment of a board of arbitration, should the city and company be unable to reach an agreement in regard to a further extension. The work of installing the electric light lines, according to the agreement, will commence before the end of November and the company undertakes to complete the system within the water area in four months. Sixty-four street lights will be installed at a cost for the area affected of $45 per year each.

Windsor, Ont.

Mr. G. S. Whelpton, 856 Hall Avenue, Windsor, has recently got several sizeable electrical contracts. These include the Leamington high school, and a truck factory in Walkerville.

A report was recently forwarded by Sir Adam Beck to Windsor city council, showing the financial condition of the street railway. It deals with every feature of the railway management for the 30 months it has been under Hydro control. The report enumerates various circumstances that have cut down revenue and shows that notwithstanding receipts has been more than sufficient to meet total operating expenses, interest charges and taxes. Summarized, the statement presents the following items:

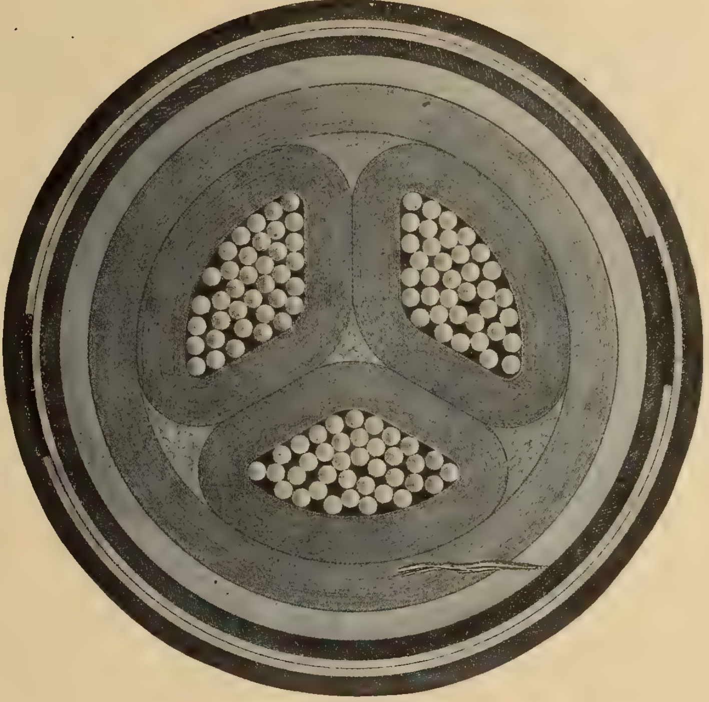
Maintenance of way and structures $97,993.30; equipment, $158,561.89; power, $124,656.84; transportation, $493,474,75; general and miscellaneous, $162,154.18; taxes $11,466.81; total expenses, $1,048,307.27; revenue, $1,316,445.58; net revenue, $268,138.31; interest, $262,930.99; surplus, $5,207.32. The report was forwarded in conformity with a request from the city council, which stated that they wished to see a financial statement before the fare boost of 5 to 6 cents was put into effect.

Winnipeg, Man.

The by-law providing for a ten-year extension of the franchise of the Winnipeg Street Railway was recently passed at its first reading. The by-law provides for remodelling the rolling stock; for certain extensions; for option to the city to purchase company's franchise rights in 1937, paying only for physical property and not franchise value, including any franchises and property in adjacent municipalities; for a joint pole agreement and for a progressive scheme for placing wires underground; for a sliding scale of reduced fares which will reach the five cent basis in 1926; for the taking over of the company's system, in default (after notice to remedy) of certain of the provisions of the agreement and many other matters. The by-law will have to pass other readings, a referendum being expected in December.

Messrs Gamble and Wills have removed from 306 Notre Dame Avenue, to more centrally located premises at 342 Garry Street, Winnipeg. During the week that they have been in their new store they report splendid business, far better than they ever anticipated. Considering they are a young firm they have made splendid progress, and great credit is due them.

POWER CABLE



350,000 C. M. 3-Conductor 12000 volt
Paper Insulated, Steel Tape Armoured Cable

Overall Diameter—3.62 ins.
Built to Specification of Hydro-Electric Power Commission of Ontario

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Eugene F. Phillips Electrical Works, Limited
Montreal

The Oldest and Largest Manufacturers of Bare and Insulated Wires and Cables in the British Overseas Dominions

Wiring Contracts Awarded

Hamilton, Ont.
J. A. Dynes, Prospect St., $65,000 office bldg., Main & Walnut Sts.
R. Avis, 157 Balsam Ave. on add. to office bldg. "Delta."

Kitchener, Ont.
Star Electric Co., 91 King Street, West, $250,000 city hall, King St. E.

Lakeside, Ont.
A. Willard, $3,500 res.

Lunenburg, N. S.
Lunenburg Gas Co., $8,000 res., Lincoln E. end.

Moncton, N. B.
F. Cuthbertson High St., $4,000 res., Maple St.
Duffy & McCarthy, Lutz Street, $4,000 res., Bromley Ave.

Montreal, Que.
Booth Bros., 5727 Sherbrooke W., $35,000 four res., Percival Ave.
A. Forget, 157 Monk Blvd., $10,000 two flats & two stores, Joicoeur.
A. Garey, $8.000 three flats, 1463 Delorimier Ave.
B. Gregory, 55 Metcalfe St., $19,200 res., Rosemount.
R. S. Muir & Co., 32 Park Ave., $45,000 four res., Belmore Ave.
Vallee & Hamelin, 1867 St. James St., $11,000 three flats, Richelieu & Agnes Sts.; $20,000 res., Blvd. St. Joseph.
Mr. Quesnel, $5,000 res., Hibernia.

New Toronto, Ont.
J. McNeice, Stop 27 Lake Shore Rd., on school.

Niagara Falls, Ont.
Perry Bros., $7,000 res., River Rd.
J. W. Thomas, 45 Fifth Ave., on residences, totalling $107,500.

Ottawa, Ont.
H. L. Allen, 272 Bank Street, $15,000 double dup. res., Clarence St.
Mr. Blakeney, $4,000 res., Noel St.
Mr. Booth, $4,000 res., Bertrand St.
J. N. Cherry, 50 Victoria St., altg. res. to flats $5,000 Sommerset St.; $7,000 res., Linden Terrace.
W. S. Chugg, $5,500 double res., 5th Ave.
Stan Lewis, 63 Metcalfe St., $20,000 club house, Cameron Street.

Oakville, Ont.
F. Sullivan, $6.000 res., Spruce St.

Rockcliffe, Ont.
H. L. Allen, 272 Bank St., $18,000 res., Nr. Ottawa.

St. Catharines, Ont.
Mr. Desand. 187 St. Paul St., on two stores, Ontario & Merritt Sts.

St. John, N. B.
Driscoll & Mackie, King Sq., $10,000 two tenements, Paddock St.

Sault Ste. Marie, Ont.
Rapid Electric Co., 725 Queen St. E. $7,0000 store block, Wellington St. W.; $14,000 garage, Queen St.
Greenwood Electric Co., 812 Queen St. E. $3,000 res., Bloir St.
Upper Electric Co., Ferry St. Niagara Falls, $8,000 add. high school, Victoria St.

Toronto, Ont.
Geo. Armstrong, 1217 College St. $7,000 each, 60 bungalows, Briar Hill Ave., Birdsall Ave. & St. Clements Ave.
Douglas Bros., 2137 Yonge St., $5,000 each two res., Cuthbert Cres.
N. McLeod, 808 Danforth Ave., $7,000 1 pair res., Strathmore Blvd.
Mr. Richardson, Oakmount Ave., $15,000 store & apt., 778 St. Clair Ave W.
B. C. Taylor, 123 Ellsworth Ave., $25,000 five res., Rockwell & Chambers; $9,000 res., Roehampton Ave.
Toronto Electric Co., 101 Duke St., $10,000 add. to bldg., Nepawa Ave & Roncesvalles.
E. Warman, 209 Soudan Ave., on res Carey Rd.; $4,500 each two res., Erskine Ave.

Verdun, Que.
S. Quesnel, 309 Church Ave., $18,000 res., Evelyn & Strathmore.

Waterloo, Ont.
Otto Reiber, King St., $15,000 res., Albert St.

Company Incorporations

Canadian Wireless Telephone Company, Limited. $100,000, Toronto; manufacture, etc., of wireless equipment.

The Beacon Electric Manufacturing Co., Limited, Hamilton, Ont., buying, manufacturing, etc., of electrical goods of all kinds.

Wireless Corporation of Canada, Limited, $50,000, Montreal, manufacturers, etc., of wireless and other equipment.

Keith Electric Refrigerator Company, Limited, $100,000, Toronto, manufacture, etc., of electric and other refrigerators.

Domestic Power Company, Limited, $49,000; generation, sale, etc., of gas and electricity; counties of Nicolet, Lotbiniere Arthbaska and Megantic, Quebec.

Les Usines Frappier, Limited, $100,000, Montreal; Manufacture, sale, etc., of electric motors and water heaters.

Canadian 'Lectromelt Furnaces, Limited $50,000, Toronto; Manufacture, sale, etc., electric furnaces, appliances and so on.

Purdy Radio Phonograph Company, Limited, $40,000, Toronto; manufacture, sale, repair, alteration, etc., of radio and phonograph goods.

The Bracebridge and Northwood Telephone Company, Limited, $4,000, Bracebridge, Ont., construction and equipment of Telephone Systems.

The Maple Grove Telephone Company, Limited, $1,200, Shelburne ,Ont., construction and equipment of telephone systems.

Christmas Merchandising Campaign of the Electrical Service League of British Columbia

A determined effort will be made by members of the Electrical Service League of British Columbia to obtain a fair portion of the Christmas trade this year through co-operative effort.

Beginning the first of December billboards scattered over the city of Vancouver will carry the message—

These posters are most attractive. In five colors is depicted an attractive Christmas scene—an electrically equipped dining table placed at a window looking out into the snow.

This billboard poster is one of a series of six, each to run for a month, all carrying the message "Electrify."

The B. C. Electric Railway Company is financing this campaign, which, however, is put out under the auspices of the electrical dealers of the city.

In addition, small 'bullet' advertisements carrying the slogan "Electrify—Give Electrical Gifts" will appear daily in the newspapers. Small cuts of this same slogan will be furnished all firms using separate space for advertising, either in the newspapers or in the street cars.

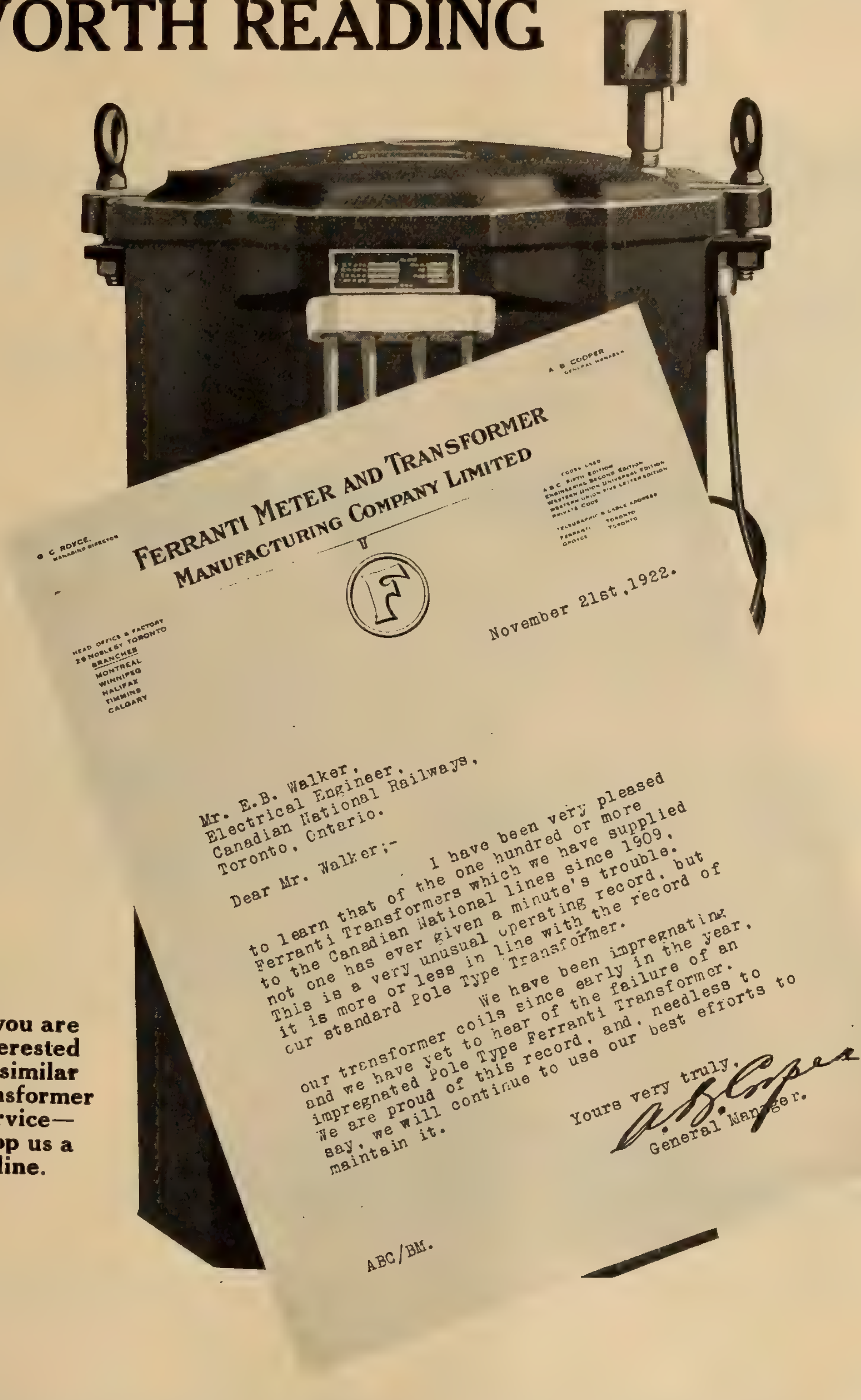
Small gum stickers in Christmas colors carrying the same slogan will be used by all electrical firms for pasting on parcels, on bills, letters, etc.

During the week of December 17-24 six large co-operative advertisements promoting the sale of appliances for Christmas gifts will appear in the newspapers of Vancouver and New Westminster.

The expense of this part of the campaign will be financed by the power company, the manufacturers, jobbers and contractor-dealers. In addition to specific suggestions for Christmas gifts these advertisements will carry the names and addresses of the co-operating firms.

All dealers will use, in addition window streamers in appropriate colors, bearing the same Christmas slogan "Electrify—Give Electrical Gifts."

A TRANSFORMER RECORD WORTH READING



G C ROYCE,
MANAGING DIRECTOR

FERRANTI METER AND TRANSFORMER
MANUFACTURING COMPANY LIMITED

A B COOPER
GENERAL MANAGER

CODES USED
A B C FIFTH EDITION
ENGINEERING SECOND EDITION
WESTERN UNION UNIVERSAL EDITION
WESTERN UNION FIVE LETTER EDITION
PRIVATE CODE

TELEGRAPHIC & CABLE ADDRESS
FERRANTI TORONTO
GROYCE TORONTO

HEAD OFFICE & FACTORY
26 NOBLE ST TORONTO
BRANCHES
MONTREAL
WINNIPEG
HALIFAX
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November 21st,1922.

Mr. E.B. Walker,
Electrical Engineer,
Canadian National Railways,
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Dear Mr. Walker;-

I have been very pleased to learn that of the one hundred or more Ferranti Transformers which we have supplied to the Canadian National lines since 1909, not one has ever given a minute's trouble. This is a very unusual operating record, but it is more or less in line with the record of our standard Pole Type Transformer.

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Yours very truly,
A. B. Cooper
General Manager.

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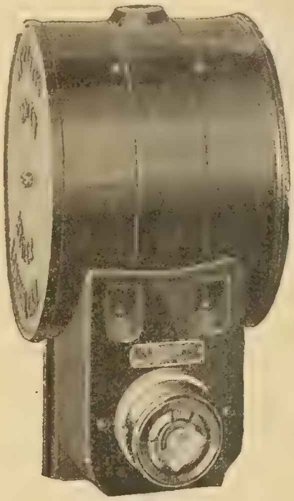
FERRANTI METER AND TRANSFORMER
MANUFACTURING COMPANY LIMITED

Head Office and Factory, TORONTO, CANADA



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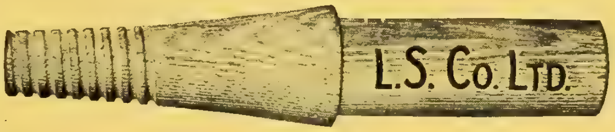

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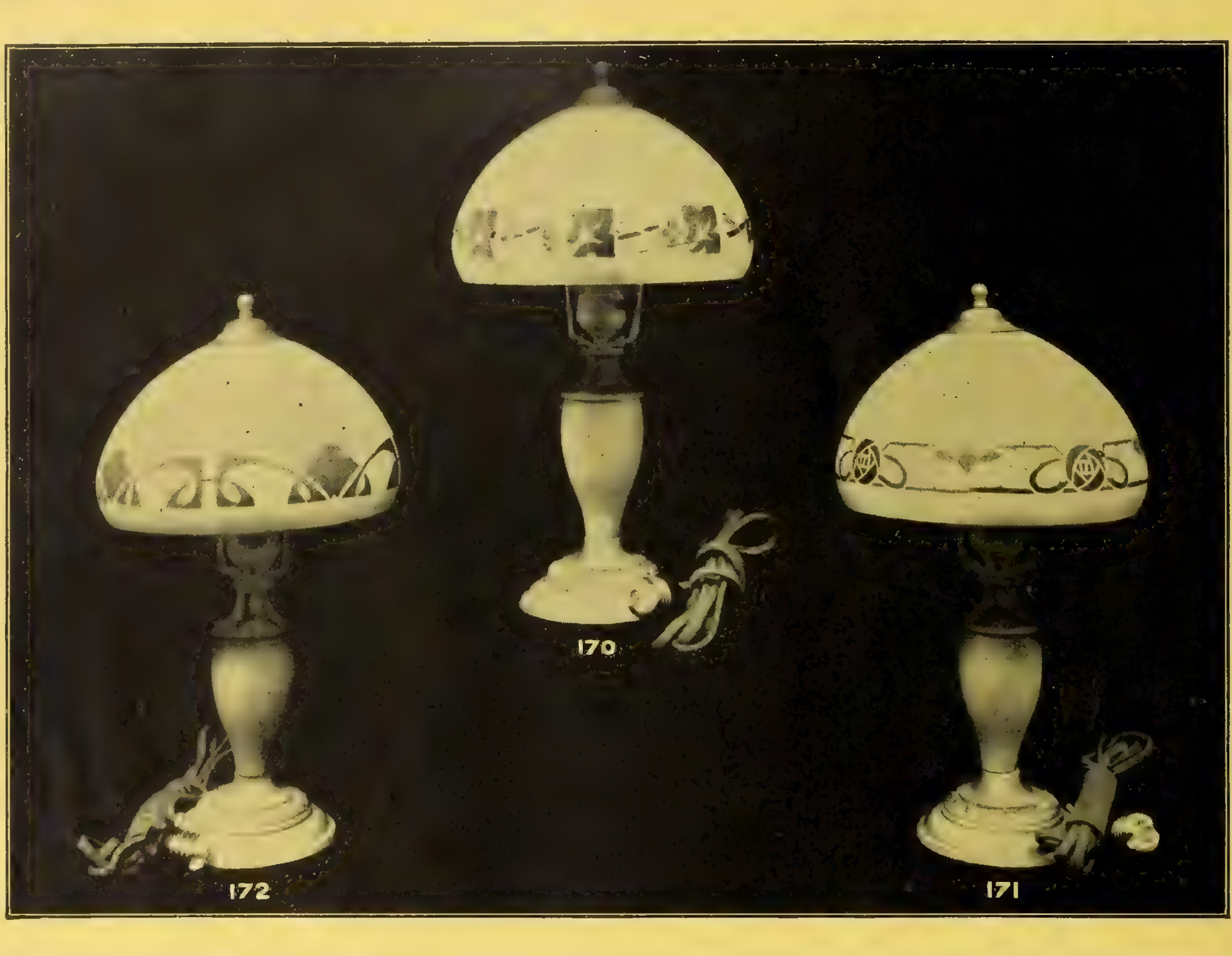

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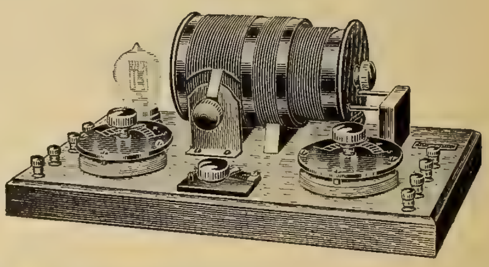

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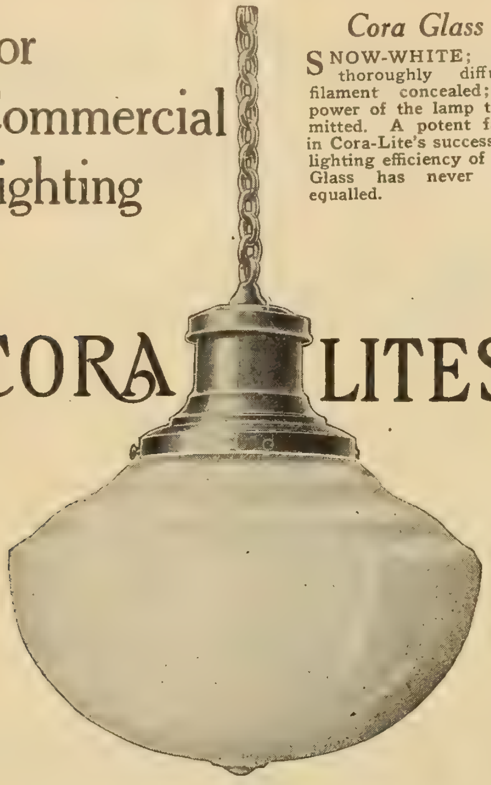

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Now's the time to sell your merchants on real window lighting for their holiday displays. Show them the value of X-Ray color lighting and special effects to make their displays more beautiful, more interesting and more effective.

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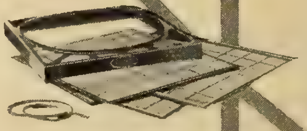
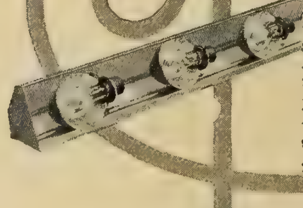


No. 66—The Color-Ray is a separate unit for attaching to standard X-Ray Show Window Reflectors for color lighting, and consists of a frame, harness and four gelatin color slides—red, blue, green and amber. By combining slides any color can be obtained.

X-Ray Spotlight

No. 10307—For getting attention the show Window Spotlight is unexcelled. It attracts special attention to the leading portions of the display by concentrating a spot of intense light upon it. This unit is adjustable in any direction, and can be made even more effective by using the color screens which are supplied.

X-Ray Footlights



No. 10308—With only overhead lighting there are often shadows, especially in displays containing wax figures. X-Ray Show Window Footlights eliminate these shadows and give the figures a more natural appearance.

Sell more X-Ray Reflectors and they will sell more for you

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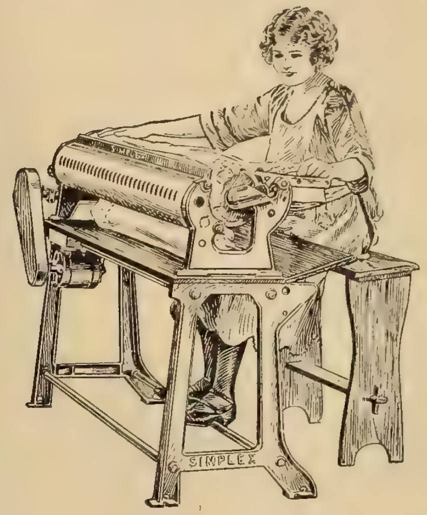

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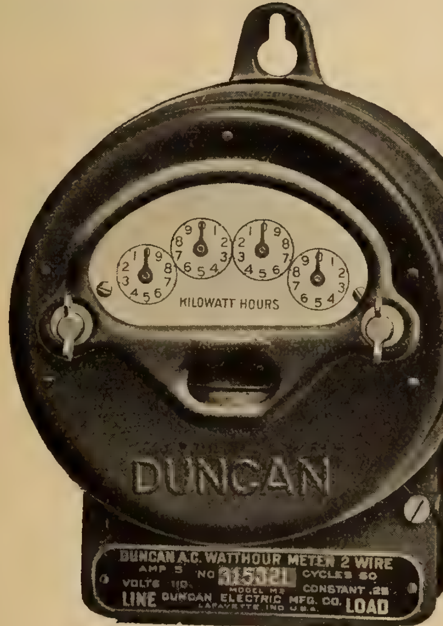

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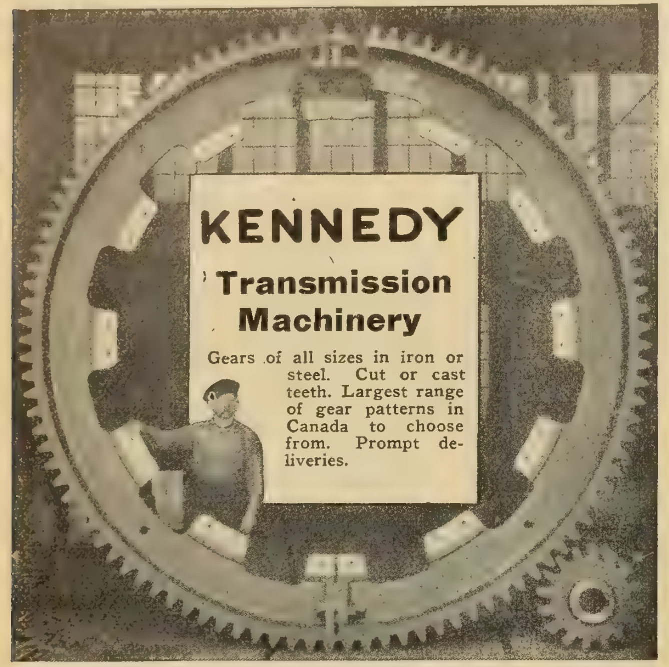

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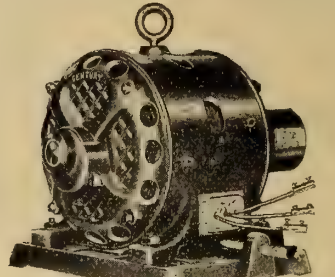

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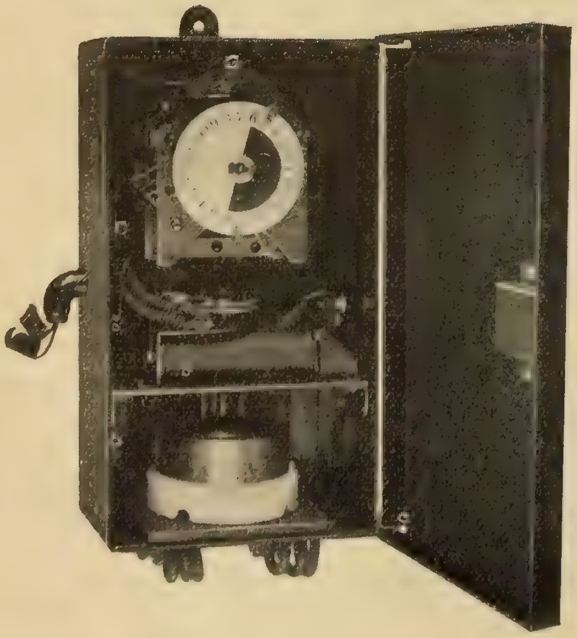

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This time switch does away with the expense of an attendant. It can be forgotten, yet it never forgets. Here is the switch people have been looking for.

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Electric Railway, by A. Morris Buck, M.E. Published in 1915 by McGraw-Hill Book Company, Inc. 390 pages, illustrated. Price $2.50.

"Engineering Electricity," by Ralph G. Hudson, S.B., 190 pages illustrated. Published in 1920 by the John Wiley & Sons, Incorporated. Price $2.00.

Handbook of Machine Shop Electricity, by C. E. Clewell. Published in 1916 by McGraw-Hill Book Company. 461 pages, illustrated. Price $2.50.

Practical Electric Illumination, by Terrell Croft. First edition, published in 1917 by the McGraw-Hill Book Co. 225 pages, illustrated. Price $1.50.

Principles of Alternating Current Machinery, by Ralph R. Lawrence. Published in 1916 by McGraw-Hill Book Company. 614 pages, illustrated. Price $3.50.

Principles of Electrical Design—D.C. and A.C. Generators, by Alfred Still. Published in 1916 by McGraw-Hill Book Co. 365 pages, illustrated. Price $2.00.

"Radio Phone Receiving." A practical book for everybody. Written by nine specialists. Recently published by D. Van Nostrand Company, 179 pages. Price $1.50.

Radiodynamics—The Wireless Control of Torpedoes and Other Mechanisms, by B. F. Miessner. Published in 1916 by D. Van Nostrand Company. 206 pages, 112 illustrations. Price. $1.50.

Telegraph Practice, a Study of Comparative Method, by John Lee, M.A. Published in 1917 by Longmans-Greene & Co. 102 pages. Price 75c.

Telegraphy—A Detailed Exposition of the Telegraph System of the British Post Office, by T. E. Herbert, A.M. Inst. E.E. Third edition. Published in 1916 by Whittaker & Company. 985 pages, 630 illustrations. Price $1.50.

"Theory and Calculation of Transient Electric Phenomena and Oscillations," by Charles Proteus Steinmetz. Third edition, revised and enlarged. Published in 1920 by McGraw-Hill Book Co., Incorporated. 696 pages, illustrated. Price $6.00.

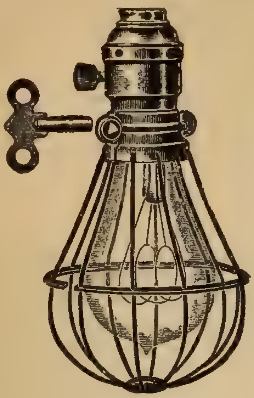
"Testing of Electrical Machinery," for non-electrical students, by J. H. Morecroft. Fourth edition, revised and enlarged. Published by D. Van Nostrand Company, 1921. 220 pages, 111 illustrations. Price $3.00.

The Dynamo (2 volume), by Hawkins & Wallis. Published in 1909 by Whittaker & Company. Price $3.00.

The School of Practical Electricity (Electrician's Course in 2 volumes. Volume 1. Published by Electroforce Publishing Company, Milwaukee, Wis. 410 pages, illustrated. Price- $3.00

The Practical Railway Spiral, by L. C. Jordan, C.E. Published in 1913 by Van Nostrand Company. 155 pages. Price 50c.

ELECTRICAL NEWS, 347 Adelaide St. W., Toronto, Ontario



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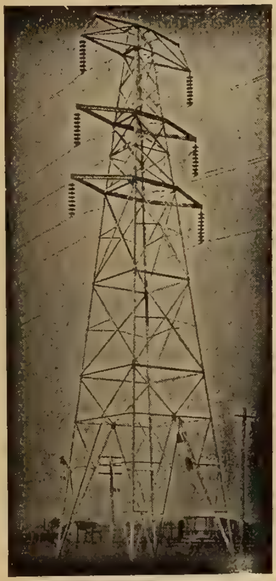

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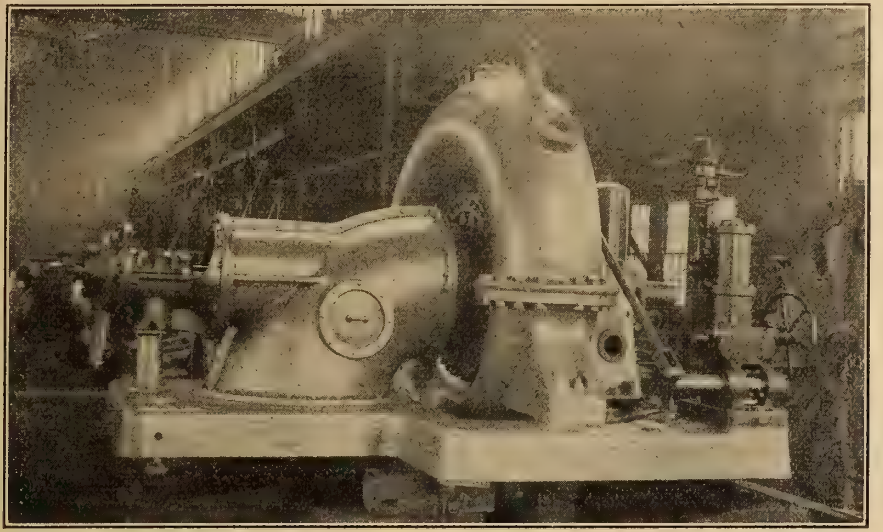

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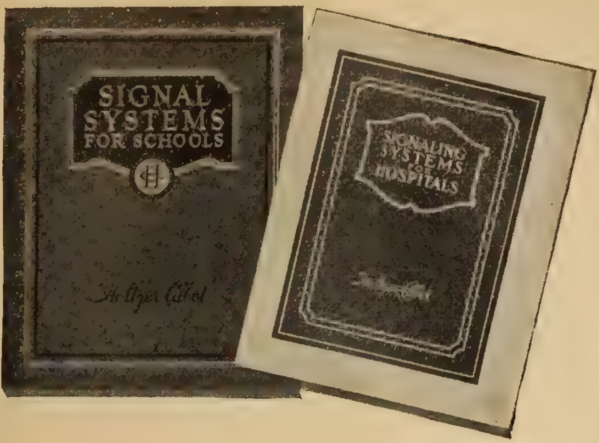

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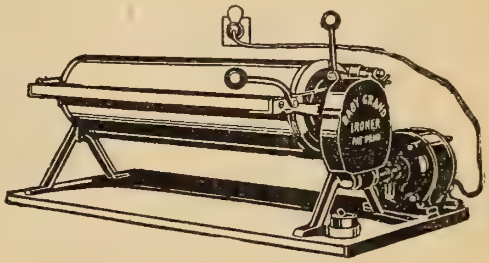

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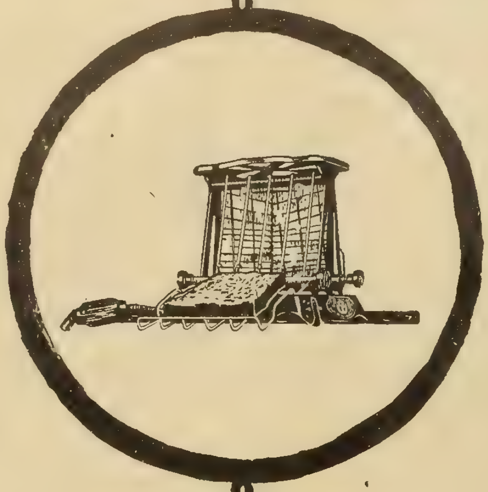

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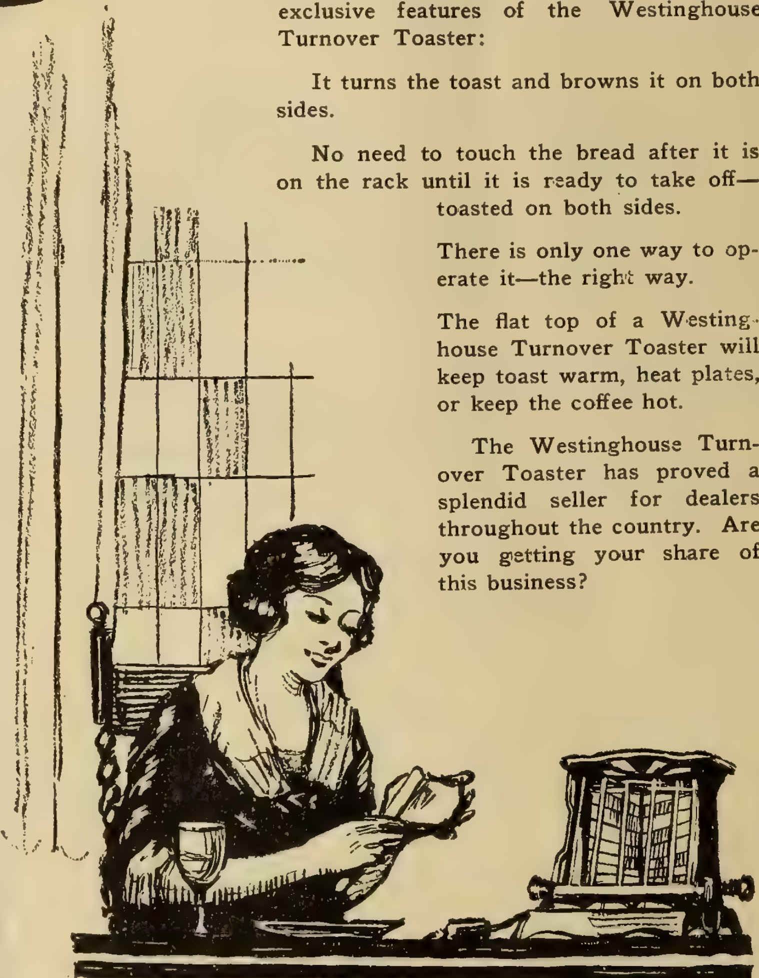
No need to touch the bread after it is on the rack until it is ready to take off—toasted on both sides.

There is only one way to operate it—the right way.

The flat top of a Westinghouse Turnover Toaster will keep toast warm, heat plates, or keep the coffee hot.

The Westinghouse Turnover Toaster has proved a splendid seller for dealers throughout the country. Are you getting your share of this business?



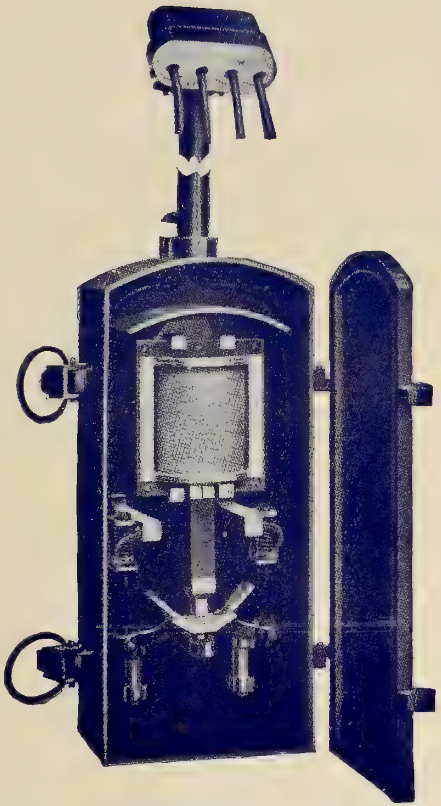
Canadian Westinghouse Company, Limited, Hamilton, Ontario

TORONTO, Bank of Hamilton Bldg.
HALIFAX, 105 Hollis St.
CALGARY, Canada Life Bldg.
MONTREAL, 285 Beaver Hall Hill
FT. WILLIAM, Cuthbertson Block
VANCOUVER, Bank of Nova Scotia Bldg.
OTTAWA, Ahearn & Soper, Ltd.
WINNIPEG, 158 Portage Ave. E.
EDMONTON, 211 McLeod Bldg.

Repair Shops:

MONTREAL—113 Dagenais St.
WINNIPEG—158 Portage Ave. E.
VANCOUVER—1090 Mainland St.
TORONTO—366 Adelaide W.
CALGARY—316 3rd Ave. E.

CANADIAN WESTINGHOUSE



Cap. 30 Amp

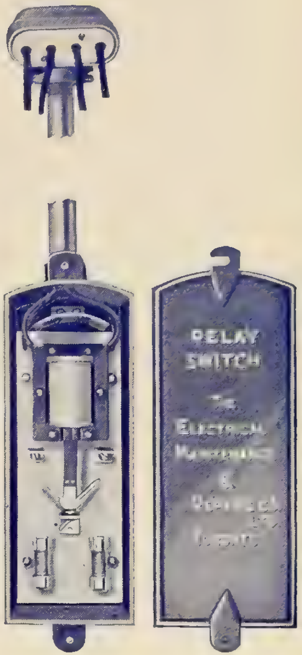
Engineers, Take Notice!

A new, smaller, simplified Remote Control Switch.

A young friend of our 30 Amp Switch—to do the many small jobs where the big fellow is too expensive.

Cheaper, yet perfectly dependable. Has been tested equal to five years' service.

For Street Lighting Control. Write about this.



Cap. 15 Amp

The Electrical Maintenance & Repairs
Company, Limited
162 Adelaide Street West Toronto

CANADIAN PORCELAIN CO.
LIMITED
HAMILTON - CANADA

Manufacturers of High and Low Tension Porcelain Insulators

Electric SWEEPER-VAC

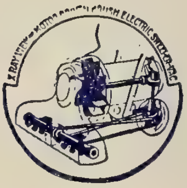
With Motor Driven Brush

It Cleans and Sweeps without injury to the rugs

FULLY GUARANTEED

Sold on easy terms **We carry the accounts**

Liberal Proposition for "Sweeper-Vac" Agencies


X RAY VIEW – MOTOR DRIVEN BRUSH ELECTRIC SWEEPER-VAC

Banishes Dirt

EARLE ELECTRIC LIMITED

Abolishes Dusting

Takes the "Weeping" out of "Sweeping"

Write now for particulars and get lined up for the Spring Trade

66-72 NELSON ST.

TORONTO

Phone Adelaide 1081 **Adelaide 1082**

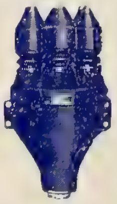
CABLE TERMINAL DEVICES

DISCONNECTING POTHEADS

The advantages of the disconnecting pothead should always be considered carefully before definite decision to use any other is made. The disconnecting feature adds little to the cost and its benefits are almost without limit, depending entirely upon the extent to which you take advantage of them.

The disconnecting pothead is the basis of a system of distribution that is more flexible than any other which could be installed or maintained or operated at anywhere near as low a cost.

Where potheads are to be installed near other manual switches the non-disconnecting pothead or plain cable seal is properly chosen. The disconnecting pothead is often used in connection with automatic switches, cutouts, etc., as it provides a disconnect which can be used in case of repairs or renewals being necessary.



POTHEADS, DISTRIBUTION BOXES

ON LINE EXTENSIONS OR IMPROVEMENTS

In planning for expansion and improvement of your distribution systems take advantage of the G and W Pothead Idea.

the value of your installation is dependent upon the adaptability of your distribution system at a time of sudden need.

Both normal conditions and the requirements of sudden demands, at a time of service interruption can be successfully met with a G and W equipped system.

The experience of the G and W staff is at your service in planning complete equipment to meet the needs of specific installations.

G & W ELECTRIC SPECIALTY CO.

Chicago Illinois

Representatives in:

San Francisco, Los Angeles, Seattle and Calgary, Canada

STOCKS CARRIED IN SAN FRANCISCO

G & W ELECTRIC SPECIALTY CO.

Vol. XXXI No. 24 Toronto, December 15, 1922

Electrical News

Engineering
Contracting

Merchandising
Transportation

CONDUITS

FOR INTERIOR CONSTRUCTION

"GALVADUCT" "LORICATED"

Look for this Label

CONDUITS COMPANY LIMITED
"CONDUITS"
"GALVADUCT" "LORICATED"
EST PROTECTIO
TORONTO, CANADA
TRADE MARK REGISTERED

It is your guarantee of Quality

THE Christmas Season once again reminds us of those most valuable of all our assets—our business friendships, and the goodwill that makes them real factors in our daily transactions throughout the year.

In expressing our appreciation of this goodwill, Conduits Company Limited wishes each one of you a good old Merry Christmas and fullest Prosperity in the New Year.

CONDUITS COMPANY LIMITED

HEAD OFFICE AND FACTORY, TORONTO

Western Sales Offices - - - Winnipeg and Vancouver

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IT gives us genuine satisfaction to ally our own trade-mark with those of the well-known companies here represented.

Each trade-mark stands for a quality product that has long since established its worth wherever electrical work is done.

Complete stocks are carried at our Branch Houses.

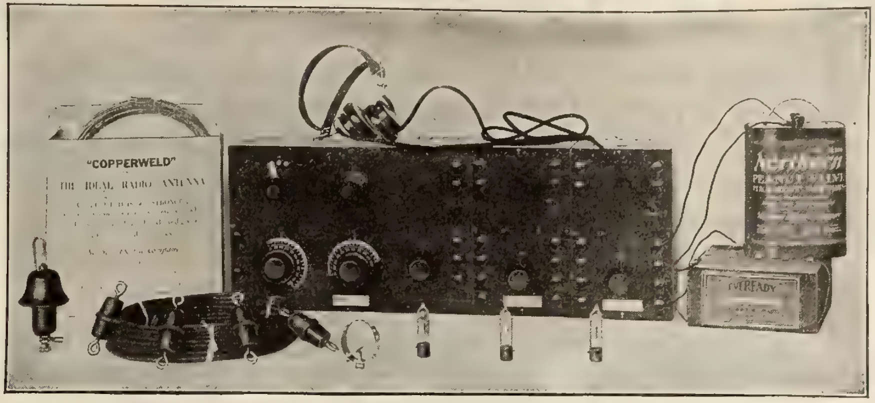
Northern Electric Company
LIMITED

MONTREAL TORONTO WINDSOR CALGARY
HALIFAX HAMILTON WINNIPEG EDMONTON
QUEBEC LONDON REGINA VANCOUVER

"Makers of the Nation's Telephones"

MANUFACTURING
- Manual Telephones
- Automatic Telephones
- Wires & Cables
- Fire Alarm Systems
- Radio Sending and receiving Equipment

DISTRIBUTING
- Construction Material
- Illuminating Material
- Power Apparatus
- Household Appliances
- Electrical Supplies
- Power & Light Plants
- Marine Fittings



The Northern Electric R 1000 Radio Telephone Receiving Set
The Set with the famous Peanut Tube, eliminating the charging of Batteries

"If Winter Comes"

AND YOU HAVE RADIO—

You are assured of high-class entertainment in your home throughout the long Winter evenings.

Radio has come to stay, not for this winter, but for all future winters.

It is acclaimed already as the "Great Home Builder"—it keeps the family circle intact.

The wonderful broadcasting of distant Canadian and United States Broadcasting Stations now being received by owners of the Northern Electric R-1000 Receiving Set is giving genuine satisfaction to thousands who "listen in" nightly to some of the finest artists of our time.

Write for our bulletins describing Radio Sets and parts

Northern Electric Company
LIMITED

Montreal	**Quebec**	**Toronto**		**Windsor**	**Regina**	**Edmonton**
Halifax	**Ottawa**	**Hamilton**	**London**	**Winnipeg**	**Calgary**	**Vancouver**

Ask your dealer or write our nearest house

The system of storage batteries for oil switch control, illustrated below, is the largest and most complete used in Canada exclusively for that purpose. It consists of two batteries and motor generators, so that one unit can float on the load at approximately constant voltage while the other battery is being charged.

EACH of the two Exide oil switch control batteries at the Queenston generating Station of the Hydro Electric Power Commission of Ontario consists of 110 cells having a capacity of 154 amperes for one hour at 230 volts, and each is capable of supplying 700 amperes for one minute for the operation of the switches and control equipment.

The switchboard indicating and signal lights are operated from duplicate 16 cell E-5 Exide Batteries floating on a 32 volt operating bus.

EXIDE BATTERIES OF CANADA, LIMITED
153 DUFFERIN ST., TORONTO, ONT.

Exide

MADE IN CANADA
BATTERIES

WHAT IS DIAMOND FIBRE?

We have selected the Electrical News as a medium to tell the Electrical Industry of Canada something about this remarkable material.

Each month we will discuss in some detail a standard part made from Diamond Fibre.

OUR CATALOGUE

Explains the process of manufacture from the cotton rags to the basis forms of sheet, rod or tube. It also illustrates many of the parts used by almost every industry.

The technical data should be of special value for your files.

A copy will be mailed upon request.

Diamond State Fibre Company
of Canada, Limited
Toronto, Ontario

F Diamond-F

F Diamond-F

THE L. and N. COMPANY Limited

ST. JOHNS, Que.

TORONTO
Robert G. Ross
56 Carlton St.

WINNIPEG
Fred. E. Garrett & Co.
501 Confederation Bldg.

MANUFACTURERS OF FLEXIBLE CONDUIT AND KRAFT PAPER CORD

LOOMDUCT

A Single Wall Conduit of Unusual Flexibility.

Every coil of "Loomduct" and "Insuladuct" is fished at the factory and guaranteed against defects of every kind.

INSULADUCT

A Double Wall Conduit of Great Strength and Durability.

TRADE MARK
Loomduct
REGISTERED

APPROVED BY THE BOARD OF FIRE UNDERWRITERS : :

TRADE MARK
Insuladuct
REGISTERED

THE FOLLOWING SIZES ALWAYS IN STOCK:—¼" ⅜" ½" ⅝" ¾" 1"

"NORTHERN"

The Better Heating Pad

(With Liberal Discounts for you!)

Three heats

Cutler-Hammer Switch

Size 12″x15″

Extra heavy eider-down cover

Washable Slip

Resolve to sell the best and make some real money on heating pads. You can do it with the "NORTHERN." The "NORTHERN" Heating Pad is constructed of the best of material and the quality cannot be surpassed. It is one of the best pads being manufactured today, regardless of price.

The "NORTHERN" Heating Pad is furnished complete with ten feet of cord, a three-heat switch, a two-piece attachment plug and is covered with soft eiderdown. A white washable slip is also furnished.

Specify "Northern" for the Holiday trade

—ORDER NOW—

Northern Electric Company
LIMITED

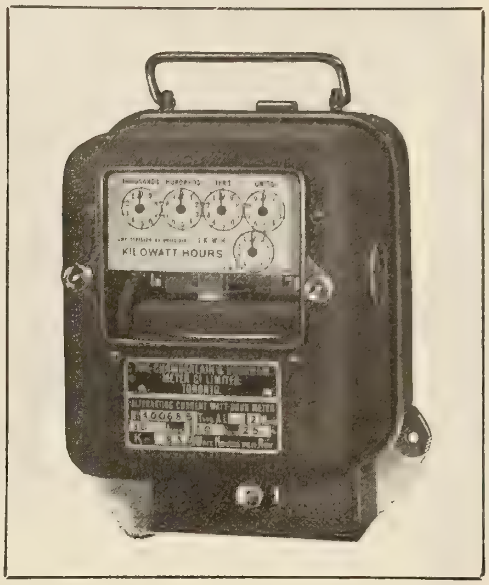
Montreal Toronto Hamilton Windsor Regina Edmonton
Halifax Quebec London Ottawa Winnipeg Calgary Vancouver

Government Re-Testing

302 C & H Meters were due for re-inspection in an Ontario town.

They were sent into the test room on Monday, the following Friday 302 Meters left the test room resealed, no parts or repairs being required to accomplish this end.

How's this for quality and reliability? Send us your orders.



Chamberlain & Hookham Meter Co., Limited

243 COLLEGE STREET, TORONTO

Branches all over the World

Thomson Electric Motors

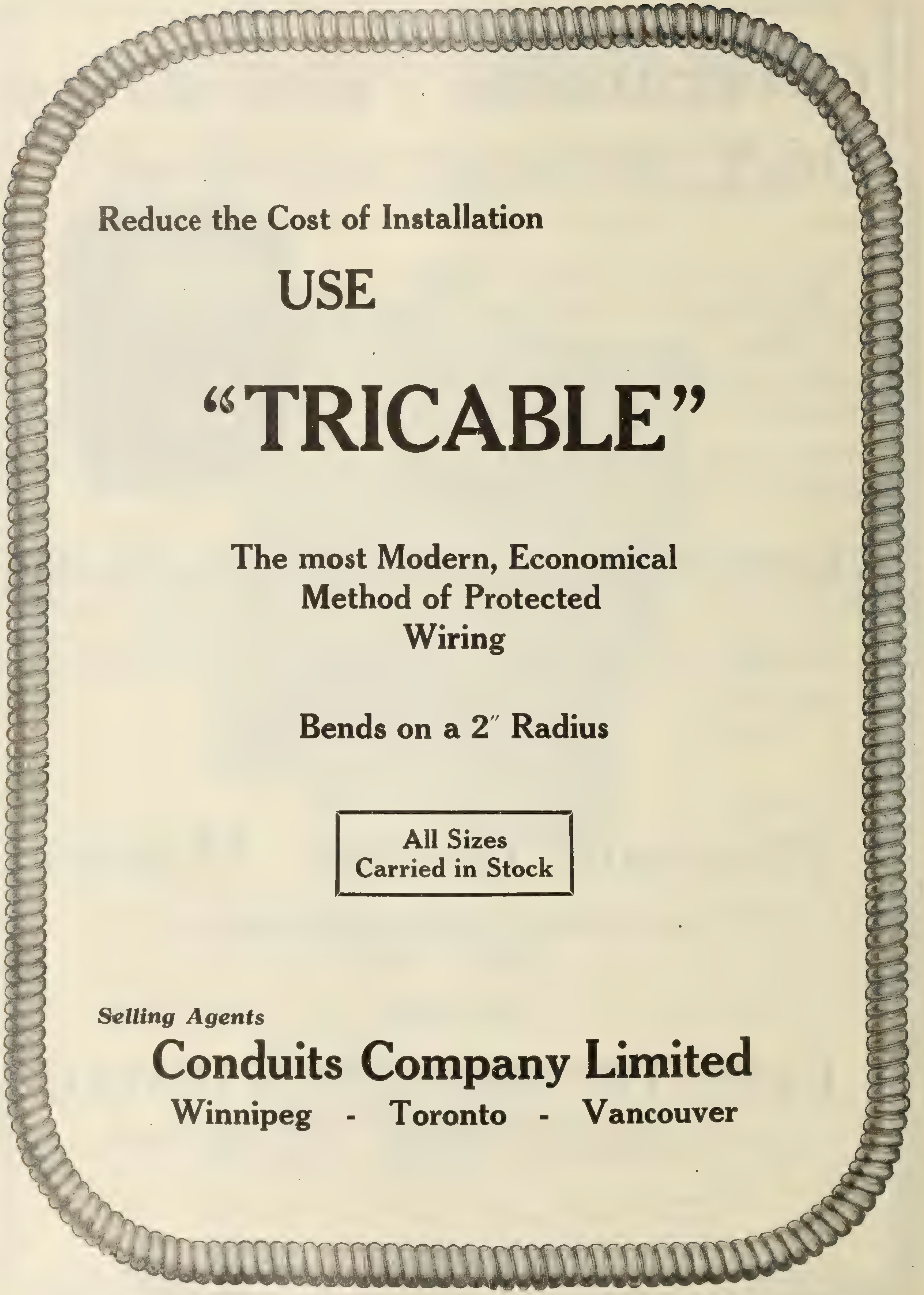
in use in many of the largest manufacturing
plants in Canada

are built by

FRED THOMSON CO., LIMITED

ELECTRICAL ENGINEERS

7-13 ST. GENEVIEVE STREET MONTREAL



Reduce the Cost of Installation

USE

"TRICABLE"

The most Modern, Economical
Method of Protected
Wiring

Bends on a 2″ Radius

All Sizes
Carried in Stock

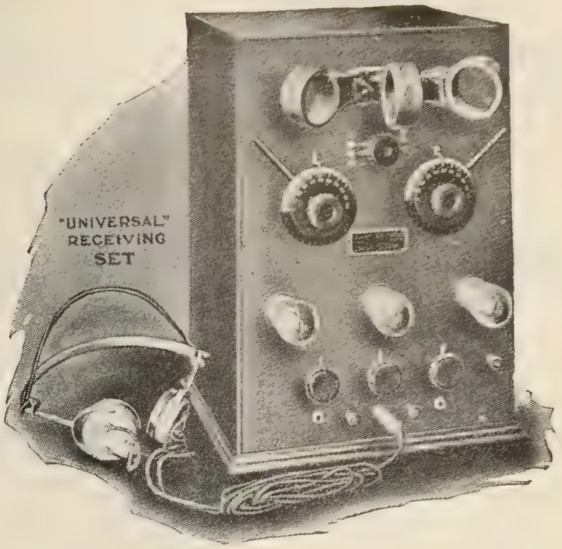
Selling Agents

Conduits Company Limited

Winnipeg - Toronto - Vancouver

Standard *RADIO* Equipment

(De Forest Patents)



A reputation for manufacturing radio receiving sets that give greater efficiency than any other make is creating a demand for our sets that even with our increasing production will tax all our resources to keep up with it.

To own a radio set manufactured by us is to ensure the maximum enjoyment to be obtained from radio.

PLACE YOUR ORDER NOW

You need not wait longer—the efficiency sets are available.

"SC-10 RADIO RECEIVING SET

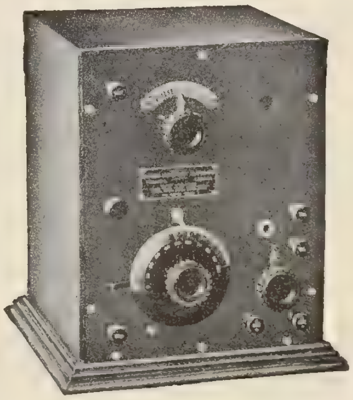
Our "SC-10 RADIO RECEIVING SET is a short wave length regenerative set designed for those who would rather purchase a single unit and add one to our type "S" two step Audio amplifiers later on. This set is very easy to operate and is similar in type and equal in quality to the American best sellers.

We will be pleased to send you, on request, a copy of our R30 BULLETIN, which gives full information on our radio equipment.

UNIVERSAL RECEIVING SETS

Our "UNIVERSAL" RECEIVING SET consists of the necessary tuning elements, a detector unit and two stages of Audio amplification, all assembled in a highly finished quarter-cut oak cabinet. The "B" batteries are also placed in the cabinet. This set will respond to wave lengths 180 and 20,000 meters. HONEYCOMB COILS are used for inductances associated with high grade condensers having Vernier attachments.

Owners of these sets are breaking long distance receiving records.



"SC-10" Radio Receiving Set

Dealers write for information

CANADIAN INDEPENDENT TELEPHONE CO., LIMITED

OFFICES: 212 King Street, West FACTORY: Wallace Ave., TORONTO

WESTERN DISTRIBUTORS:

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Radio Corporation of Vancouver, Vancouver, B.C.
Radio Corporation of Regina, Regina, Sask.
Radio Corporation of Calgary, Calgary, Alta.

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Rubber Covered Wires and Cables

FOR POWER, LIGHT AND TELEPHONE WORK

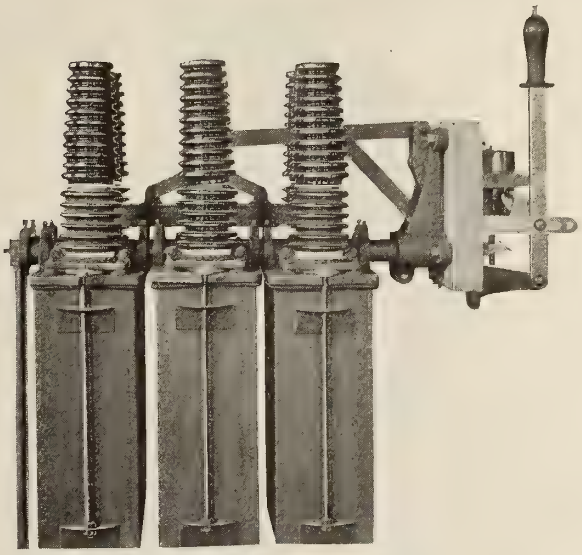
Incandescent Lamp Cord, Flexible Switchboard Cables, Special Cords and Cables for all kinds of Electrical Work.

Prompt Shipments from Canadian Factory.

BOSTON INSULATED WIRE & CABLE CO., Limited

Canadian Office and Factory, HAMILTON, ONT.

Monarch Oil Circuit Breakers Have Many Outstanding Advantages



Monarch Type M-7, Form "P", Oil Circuit Breaker

All **Current Carrying Parts** are generously designed and Moving Contacts employ only low Current Densities for all ratings. As a result Temperature rises for full loads will not exceed the standard limits for this characteristic.

All **Structural Parts** are as simple as possible and only the best workmanship is embodied in them. Their general construction makes installation and operation easy and reliable.

The **Rupturing Capacity** of the various types more than fulfils the demands of operating service for the various sizes due to the especially rugged construction of Monarch Equipment.

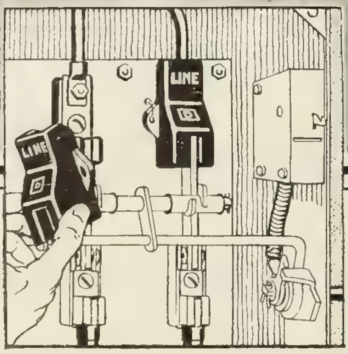
Monarch Oil Circuit Breakers are operating daily under some of the most trying conditions on the largest systems of the Dominion.

The Monarch Electric Company Limited have specialized in the manufacture of Electric Switch Gear for the last fifteen years and will be glad to quote you on any of your requirements for this class of equipment.

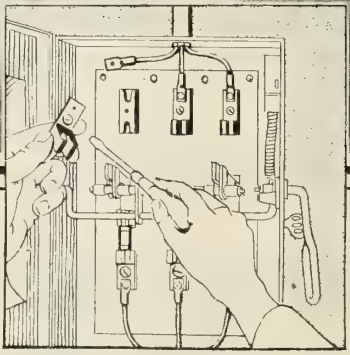
Monarch Oil Circuit Breakers are All-Canadian-Made

Monarch Electric Company, Limited

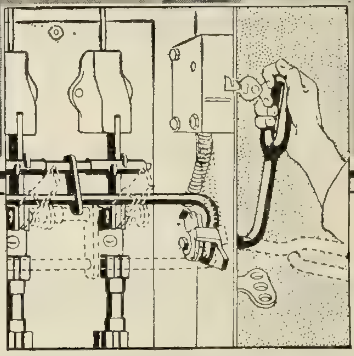
St. Lambert **District of MONTREAL**



Protective covers for line terminals prevent shocks and shorts. Optional equipment



Individual bases permit removal of any blade or jaw in three minutes



Powerful quick make and quick break mechanism enclosed to prevent clogging by dust, etc.

SQUARE D

MAKES ELECTRICITY SAFE

Only if You Have a Key

Can You Open The Cover When The Switch Is On

The Square D patented cover control of the 80000 Series embodies, for the first time on any switch, every feature ever demanded of a safety switch.

When the switch is on, the cover cannot be opened; when the cover is open, the switch cannot be closed—*except by one who has the Square D key!* This key permits inspection of the switch without interrupting the circuit, and operation with the cover open. Or it will lock the cover permanently shut, whether the switch is on or off. This not only provides absolute safety, but prevents unnecessary stoppage of machinery when inspection is necessary.

Replace a Blade in 3 Minutes!

All current carrying parts can be quickly replaced from the front of the box because they are mounted on individual bases of moulded insulating material which will not break. Installation has been made easy; first, by allowing ample wiring space at top and bottom of the box; and second by Easy-Wiring end plates with knockouts or bushings to accommodate any kind of conduit or open wiring. Electricians appreciate these two time and labor saving features.

New Type of Crossbar

The insulated steel crossbar of the 80000 Series provides strong and rigid construction. It cannot warp out of alignment—or char or split; Square D Multi-Spring Jaws have three tension points to maintain positive contact even with blistered blades; and the powerful quick make, quick break mechanism snaps the blades home sharply and completely. Located inside the box, it is protected against dirt and grease which might retard its operation.

The Ultimate Switch For Every Use

It is possible to obtain safety switches embodying some of the features of this new Square D. But no other switch has them all. No other switch is so adaptable for every conceivable use or gives such complete and lasting satisfaction from every standpoint. Write our nearest office. A representative will bring a switch and show you its superiorities.

SQUARE D COMPANY, Walkerville, Ontario, Canada
Sales Offices at Toronto, Montreal, Vancouver and Winnipeg

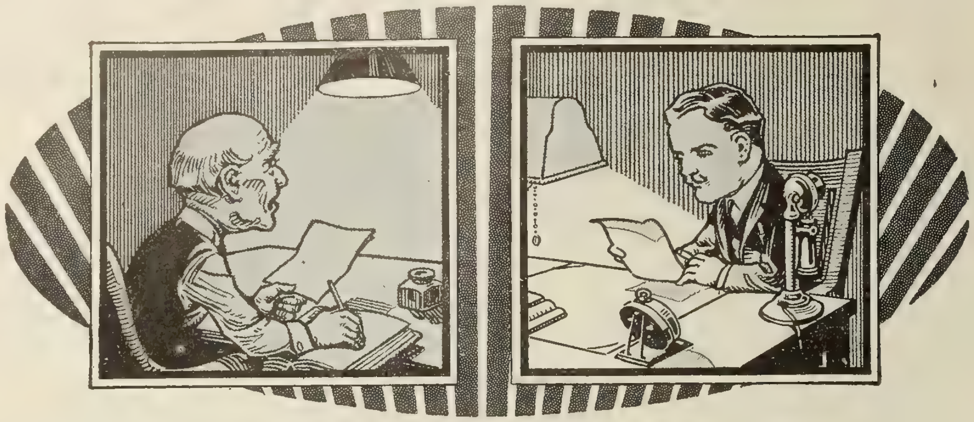
(15)

SAFETY SWITCH

FOR EVERYONE

SQUARE D KEY
FOR AUTHORIZED PERSONS ONLY

COPYRIGHTED 1922 BY SQUARE D CO.



Why Don't You Use Carbon Filament Bulbs?

CARBON filament bulbs were satisfactory forty years ago. There was nothing better available. Billing your customers for current without considering their measured demand was also proper at that time. But today, we have mazda bulbs and the Lincoln Maximum Demand Meter.

The Lincoln Meter tells you the maximum demand of each consumer every time his meter is read. This reading and the readings of other customers enable you to distribute your fixed charges equitably. Each customer pays for his service in proportion to the cost of producing that service plus a legitimate margin.

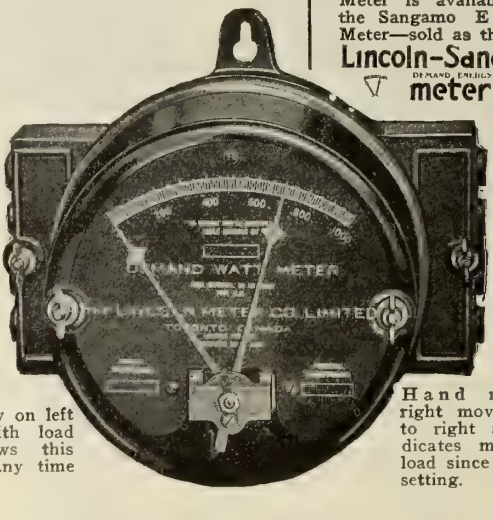
Modern business has established many different kinds of manufacturers. Because each one uses current differently, each should be billed by a modern **method**—on a demand basis. With Lincoln Maximum Demand Meters you can measure their demand either to a watt base or to a volt-ampere base considering power factor. Write us for any information—no obligation.

The Lincoln Demand Meter is available with the Sangamo Energy Meter—sold as the

Lincoln-Sangamo
DEMAND ENERGY
meter

Write for the section or (sections) of the Lincoln Meter catalogue which interests you. SECTION I is a non-technical treatise on why demand should be measured; SECTION II, the technical treatise on demand measurement; SECTION III, Installation; SECTION IV, the Lincoln Graphic Demand Meter; SECTION V, the Lincoln method of Volt-Ampere Demand Measurement (Power Factor recognition); and Section VI, the Lincoln Split Core Transformer and Demand Ammeter.

The Lincoln Meter Co., Limited
72-74 Stafford Street, Toronto, Canada
Cable "Meters" Toronto. Phone Trinity 1374

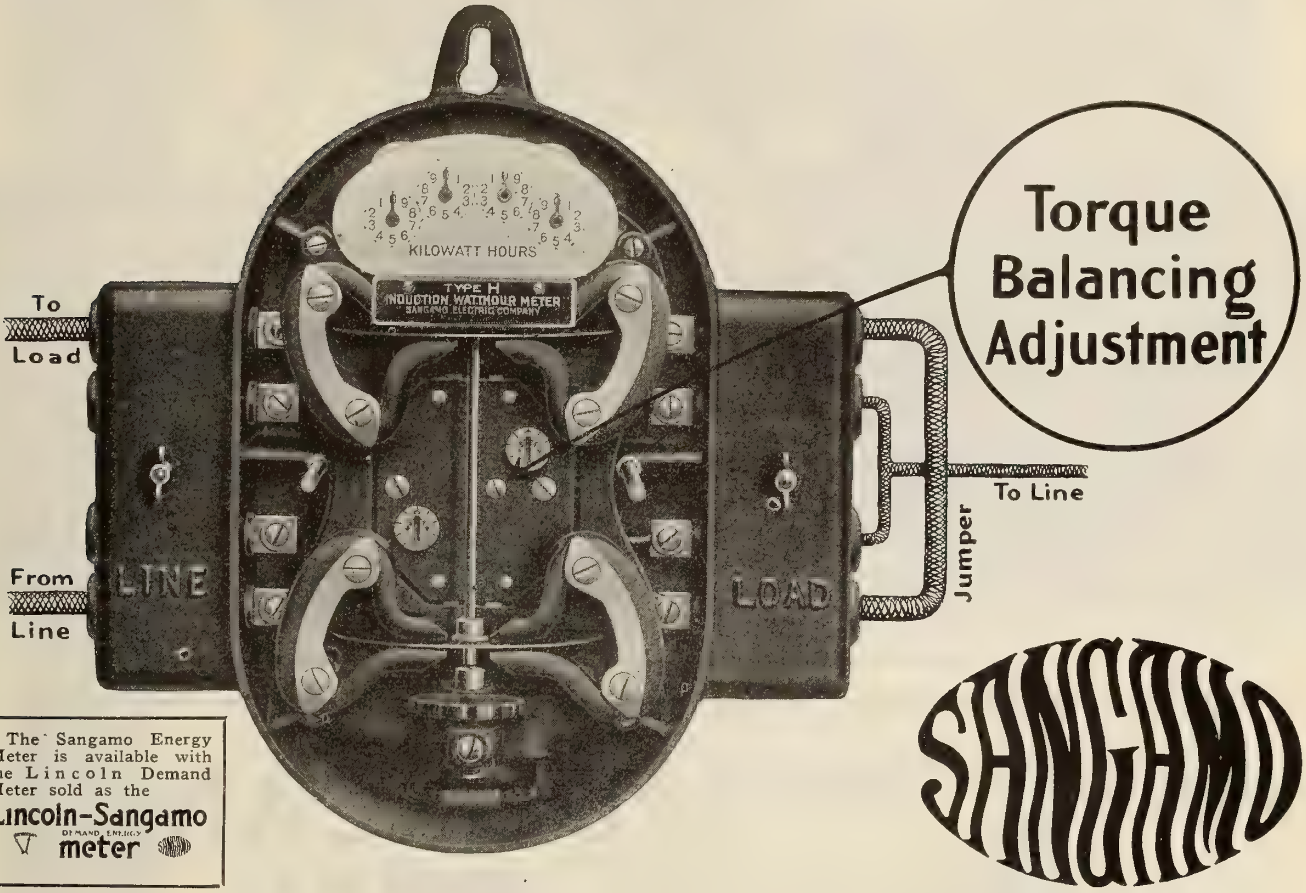


Hand now on left varies with load and shows this load at any time of day.

Hand now on right moves only to right and indicates maximum load since last resetting.

Lincoln MAXIMUM DEMAND meter

Sangamo Torque Balance of Polyphase Meter



The Sangamo Energy Meter is available with the Lincoln Demand Meter sold as the

Lincoln-Sangamo
DEMAND ENERGY
meter

SANGAMO

Sangamo design permits an instant balance of the two elements for torque in Polyphase meters. It is only necessary to buck the elements with a "Jumper" as shown. Loosen two clamp screws of the plate and turn the torque balancing adjustment screw until disc movement ceases. This adjustment varies inversely the magnetic air gaps of the two elements until correct balance is obtained. This important adjustment, so troublesome in many types, is extremely simple and positive with Sangamo Polyphase meters.

Our nearest agent can give you many other reasons why type "H" Polyphase meters should be on your lines. Bulletin No. 5518 describes them.

Sangamo Electric Company
of Canada, Limited

Factory: TORONTO **Head Sales Office:** MONTREAL

Banfield Adjustable-Lite

The handy lamp with many uses. They are made of solid brass in three finishes Brushed Brass, Bronze and Nickle, very durable, handsome in appearance, stands 12 inches high, with 5 inch by 3 inch base which is made in the form of a clamp, felt lined so as it will clamp on highly polished furniture without scratching or marring the finish. The shade is 5¾ inch in diameter. A new type Levolier lever socket is used and an eight foot cord with plug is attached to every lamp. Secure your Christmas supply now, your favourite jobber has them.

Western Representatives:

Cochrane, Stephenenson & Co. Ltd.
Winnipeg - Vancouver

W. H. Banfield & Sons Ltd.
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We are glad to demonstrate the superiority of Duncan Meters, or we will send you bulletins describing them fully.

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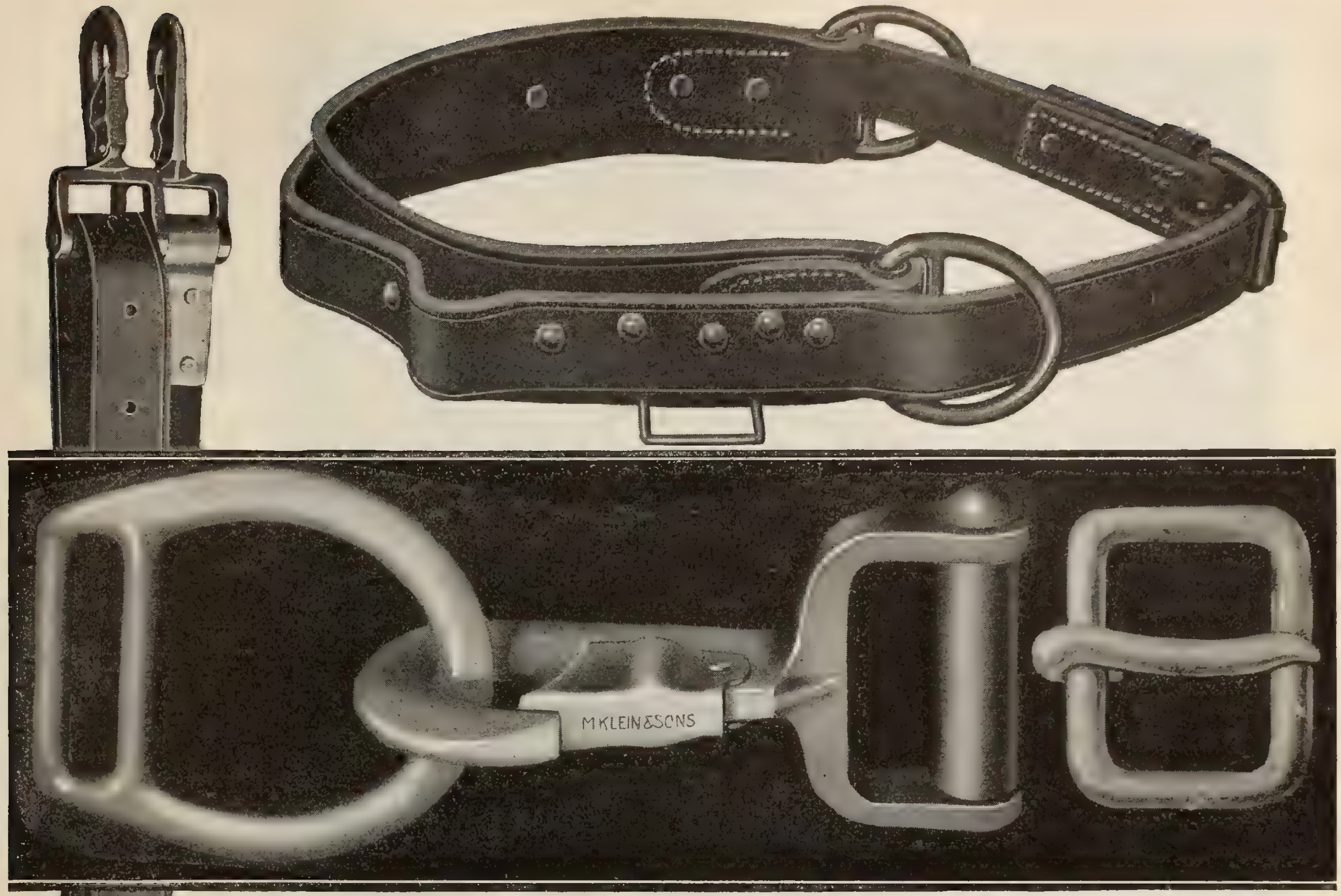

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It's a fact! From now on Klein Tool Belts and Safety Straps will be equipped with solid drop forged tested hardware at D rings, snaps and buckles! And this big improvement won't make them cost a cent more!

It makes them safer yet! Over size, over strength, solid copper riveted and sewed throughout, reinforced at D rings and snaps with copper safety liners, made from the finest oak tanned harness leather—the "old timers" take no chances—they use Klein's!

KLEIN TOOLS EST. 1857 TRADE MARK REG

Mathias KLEIN & Sons

Established 1857

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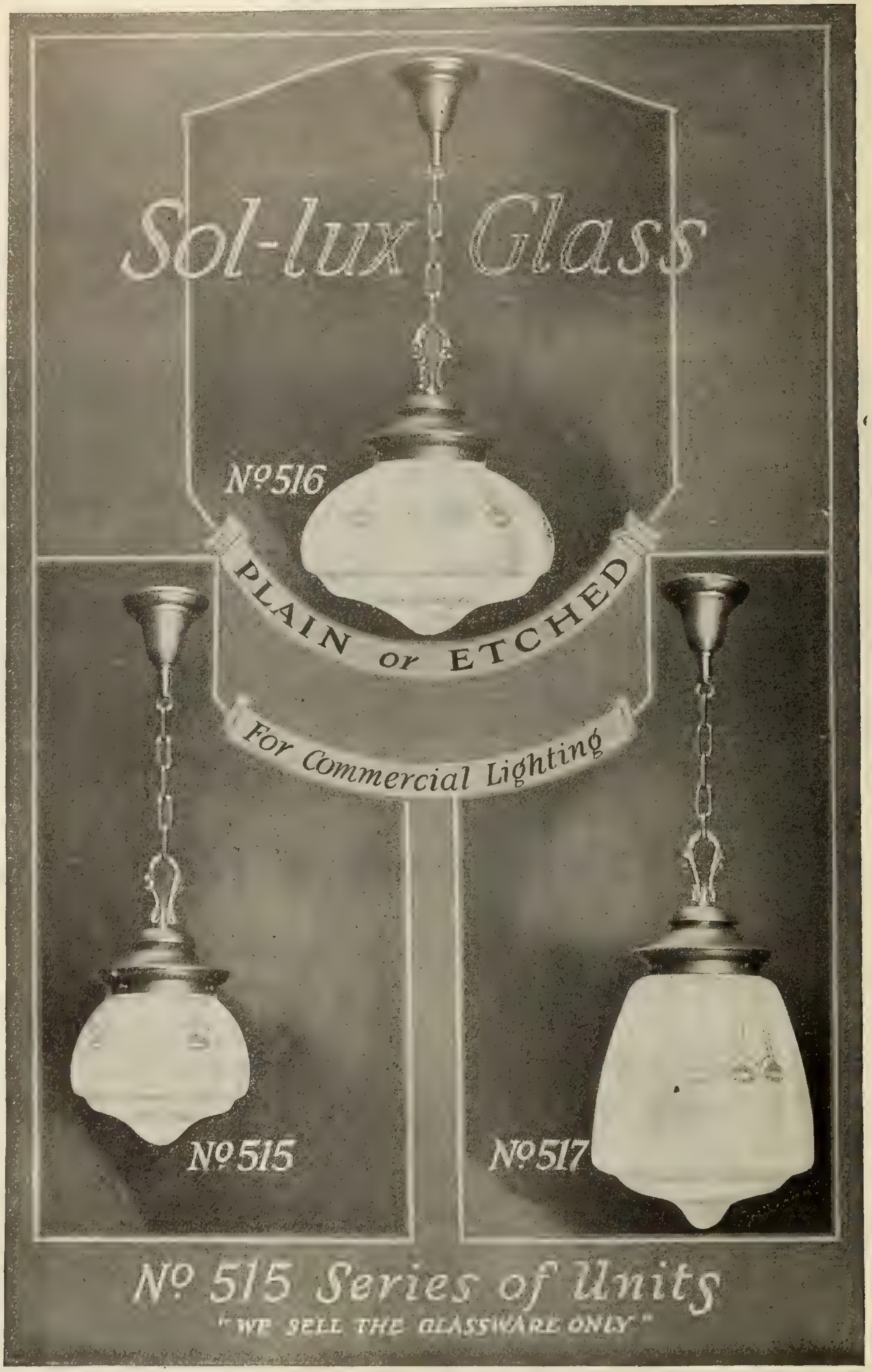

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To Our Customers

ANOTHER year has passed since the directors, officers and staff, of the Canadian General Electric Co., Limited, had the pleasure of extending to you the Compliments of the Season.

* * *

Appreciative of the friendship and co-operation of our customers during the past year, we pledge ourselves to do everything in our power to further the interests of the Electrical Industry in 1923.

* * *

On behalf of our branch managers and their respective staffs, located from Coast to Coast, may we once more wish the Electrical Industry, a Happy Holiday Season and a Prosperous New Year.

Canadian General Electric Co., Limited

HEAD OFFICE TORONTO

Branch Offices: Halifax, Sydney, St. John, Montreal, Quebec, Cobalt, Ottawa, Hamilton, London, Windsor, South Porcupine, Winnipeg, Calgary, Edmonton, Vancouver, Nelson and Victoria.

We Wish You a Busy Christmas And a Still Busier New Year

WE sincerely trust that the holiday season will prove to be the most profitable you have ever experienced.

Hotpoint

Electrical gifts are no longer novel—everyone is giving them—they are still up to date. And no electrical appliances lend themselves so well, in this capacity, as "Hotpoint Servants for the Home"!

A display of Hotpoint appliances cannot help but attract attention; even the slightest effort to secure business, by merchandising Hotpoint devices, will bring generous results.

Christmas is the Best Season Of the Year to Attract New Trade

THIS is one of the very best reasons why you should make absolutely sure, that the appliances you sell will be a lasting advertisement for your store. Be on the safe side and sell "them."

Hotpoint

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Hotpoint appliances will make money for you this Christma because they are nationally advertised—have the confidence of the public, and are manufactured up to a standard, and not down to a price.

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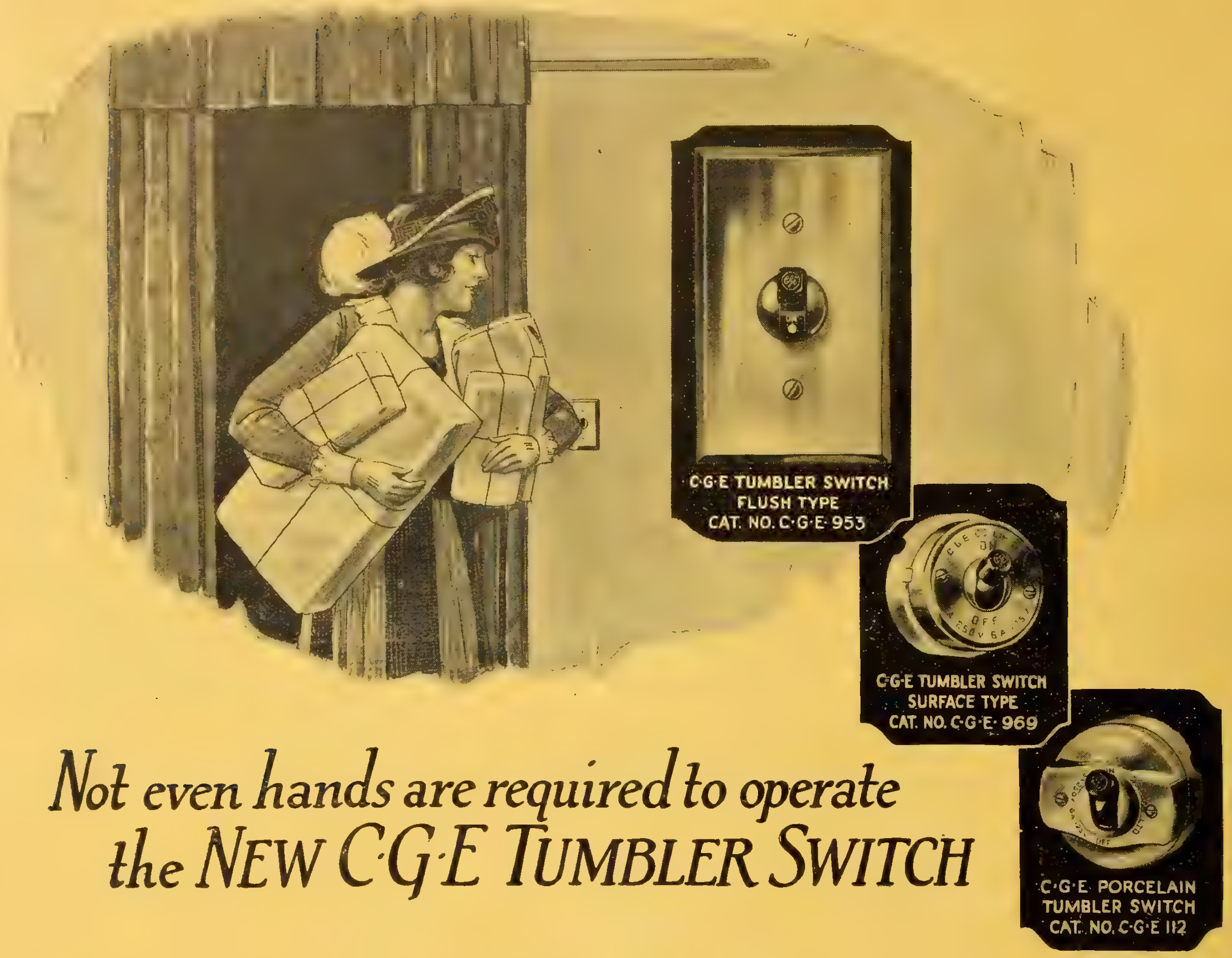

Not even hands are required to operate the NEW C·G·E TUMBLER SWITCH

HERE'S a switch that responds to the sweep of a hand across the wall —no fumbling around to find the right button. The C.G.E. Tumbler Switch works like a lever, up and down, at the lightest touch. When hands are full, an elbow answers the purpose. And yet this simple device is so sturdy and reliable, that it never gets out of order.

C.G.E. Tumbler Switches are made in three styles. The flush type— applicable to every kind of residence, is finished with a black moulded handle, and has a very handsome appearance. The surface type is small compact, and unobstrusive in appearance. The all porcelain model, which is also of the surface type, is for use in damp places.

The fact, that the button is in one position for "off" and in another for "on" makes the C.G.E. Tumbler Switch self-indicating.

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We are manufacturers, in a large way, of

TOP PINS, SIDE BRACKETS, POLE STEPS AND CROSS ARMS

We have been supplying this pole line material for from coast to coast, to the largest telephone, telegraph and electric lighting systems.

Our goods are specified where efficiency and economy are measured by actual results and not by purchase price only.

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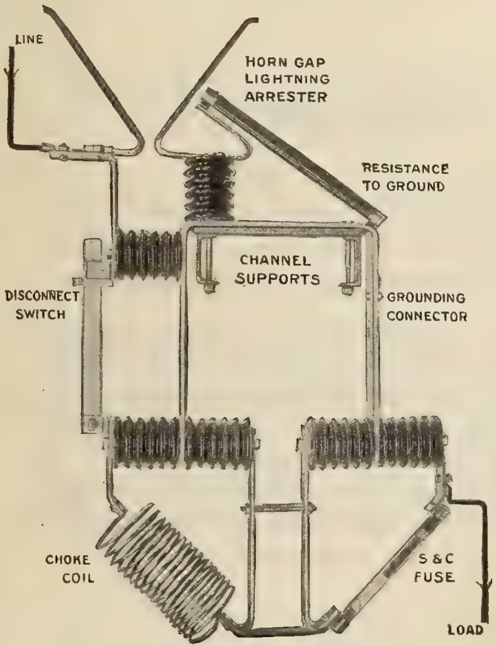

ONE SINGLE POLE "XW" UNIT
Horn Gap Arrester with Series Resistance to Ground, Disconnecting Switch, Choke Coil and "S & C FUSE" Mounting.

Simplified Substations
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for small and moderate loads for Rural Service, Small Towns, Industrial plants, etc.

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They are made in single pole, two pole and three pole combinations mounted on galvanized structural steel supports ready for your poles, with or without rod for operating switches from the ground.

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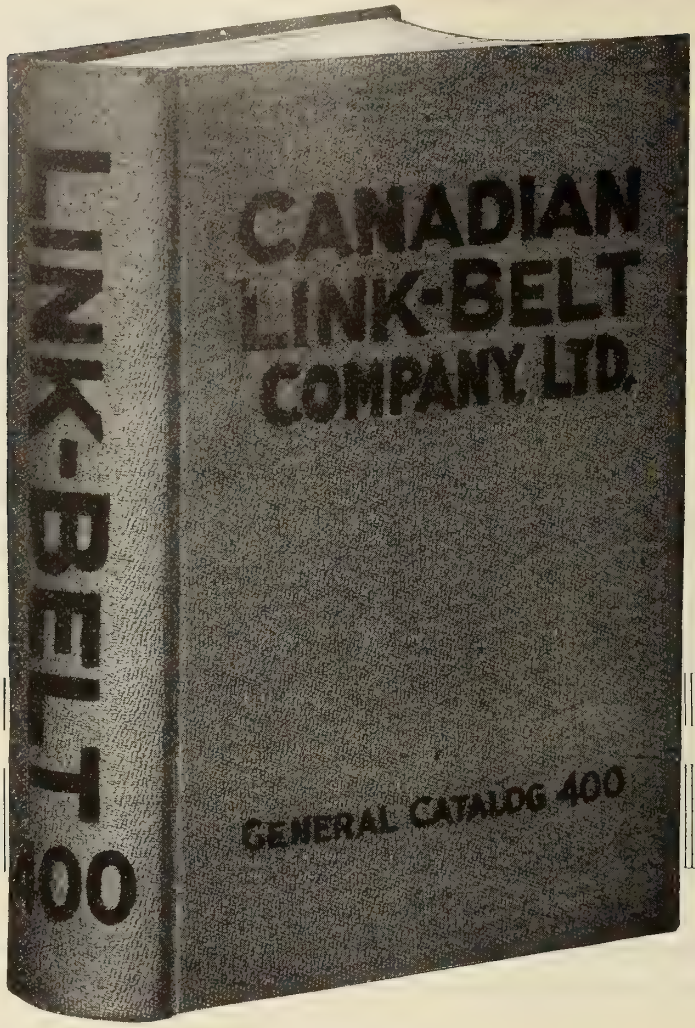

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It is the most complete catalog we have ever issued. Use it as your guide in preparing plans for your material handling and power transmission equipment.

Engineers, architects, superintendents, purchasing agents, and those responsible for production, should have a copy. We shall be pleased to send the book to the right man in your organization, if it can be used to our mutual advantage. Address our nearest office, on your letterhead, giving your name and position.

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Receive our handsome monthly blotter Free. A postal card will add your name to our mailing list.

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We have a large stock of these meters which can be supplied with either clock or cyclometer type of dial, and in six terminal or seven terminal styles. The shunt leads are brought out to a separate terminal in the "Seven Terminal" meter, which isolates the Line Voltage from the current coils, thereby reducing chance of short-circuits between coils and coils and case.

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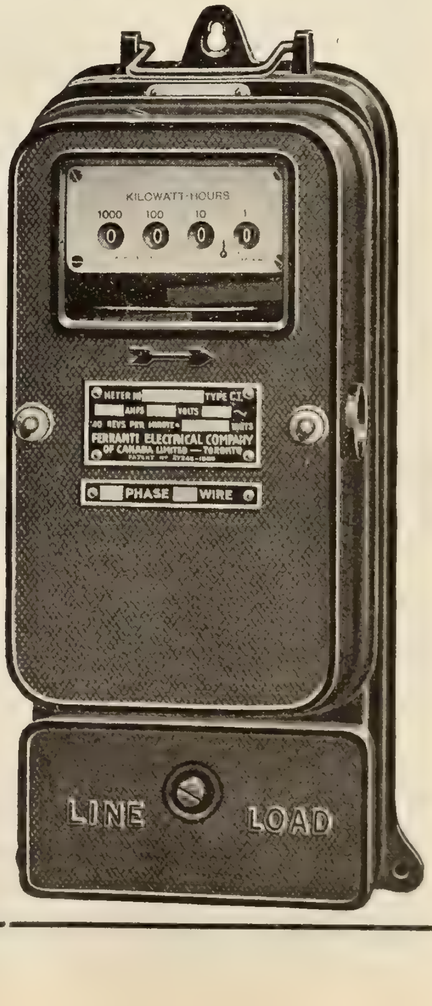

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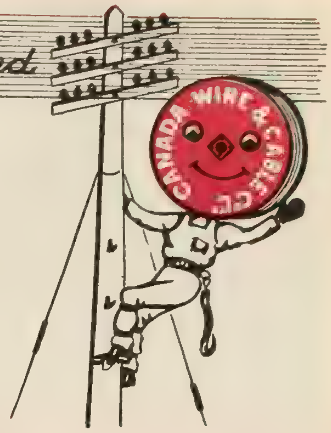
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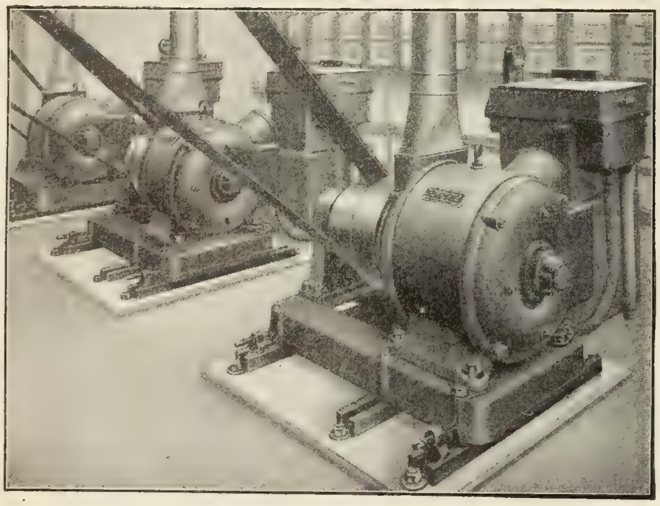

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Are Coming Down

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It will make money for you.

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"Turn to the right
and back comes your light"

with
a

"Repeater-6" Fuse Plug

"Repeater-6" marks the greatest forward step in the history of fuse making. It can be used six times and then refilled at a cost of a few cents. When one fuse blows, simply turn the switch to the right and back comes the power or light.

"Repeater-6" is made in 7 amperages ranging from 6 to 30 and the voltage is 110 to 125.

You can obtain your requirements from the electrical jobber or by writing us direct.

Manufactured by
Repeater Six Fuse Plug Co.
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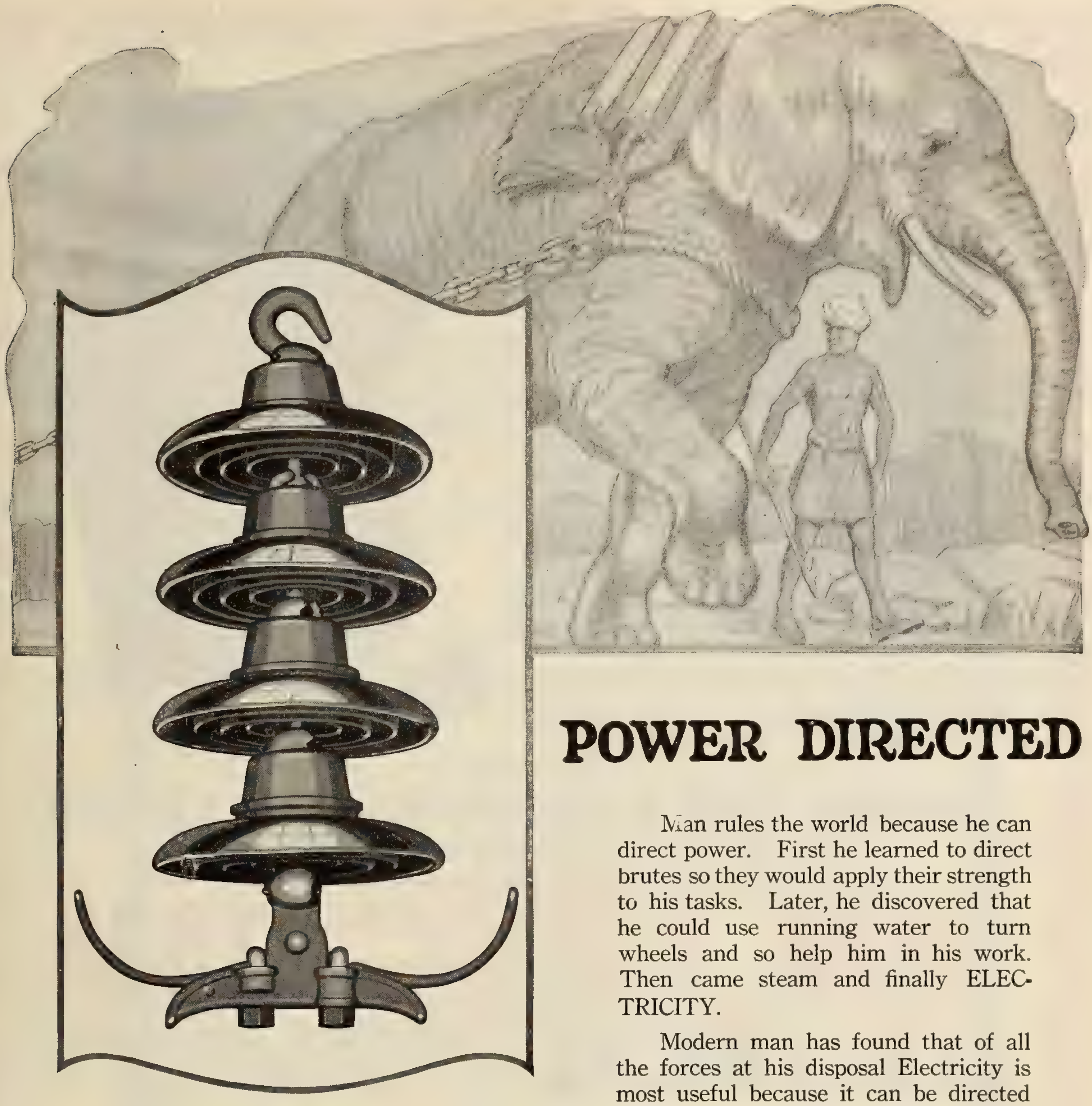
BURLINGTON, ONTARIO, CANADA



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POWER DIRECTED

Man rules the world because he can direct power. First he learned to direct brutes so they would apply their strength to his tasks. Later, he discovered that he could use running water to turn wheels and so help him in his work. Then came steam and finally ELECTRICITY.

Modern man has found that of all the forces at his disposal Electricity is most useful because it can be directed wherever it is needed, whenever it is needed and in the required quantity.

In the direction of Electricity, O-B Insulators play a leading part. All over the world power is being directed, from the station where it is generated to the point where it is used, over wires supported safely, reliably by O-B Insulators.

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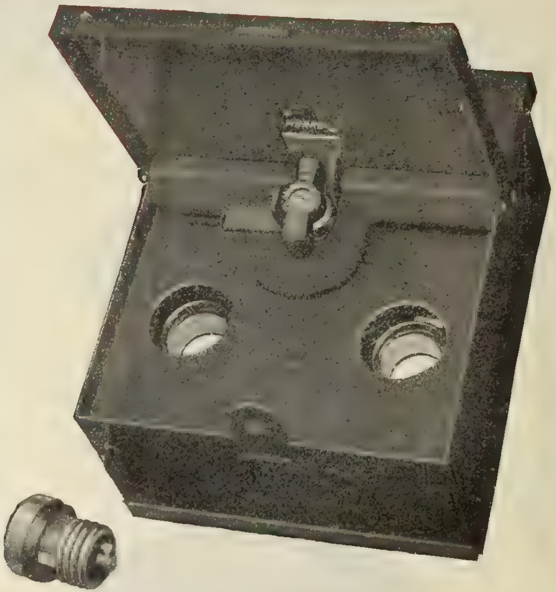
Products: Trolley Material, Rail Bonds, Electric Railway Car Equipment, High Tension Porcelain Insulators, Third Rail Insulators

Nesbit Type WK-10 and WK-20
SAFETY MOTOR STARTERS

Type WK-10
For motors up to 2 H.P.

These well-known starters for starting small single phase and three-phase motors are approved by the Board of Fire Underwriters and the H.E.P.C. 125-250-440-550 Volts A.C. They give long and efficient service.



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For motors up to 5 H.P.

Full Particulars on Request

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Canadian Drill & Electric Box Co., Limited

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1922 We Wish You all the Season's Greetings 1923

ELECTRICAL

FIXTURES, APPLIANCES —AND SUPPLIES—

We carry a full range of these lines on hand at all times and give prompt and careful attention to all orders and enquiries.

All our goods are standard and moderately priced. When you want service, order from us. Write, wire or phone today.

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Canadian Drill & Electric Box Co. Limited

JEWELERS and dentists who have made the mistake of purchasing cheap, underpowered lathe motors, as well as those using foot-powered devices, are live prospects for the dealer who sells R & M dental lathe motors. The large capacity of the motor—1/6 horse-power—its quiet, vibration-free operation, sturdy construction and workmanlike appearance make an immediate appeal, and its price, power and quality considered, is usually an agreeable surprise to the prospective customer.

Each motor is supplied complete with cord and plug, chucks, grinding wheels and buffing wheels. In addition to its use for jewelers and dentists, it is a handy outfit for household service.

Jobbers and dealers have found this motor one of the very attractive items in the R & M line. Bulletin on request.

The Robbins & Myers Company of Canada, Limited

Brantford - Ontario

Robbins & Myers Motors

Sales Tripled this Year at Walkerville on Hoover Co-operative Plan

MEN WANTED
to sell The Hoover

The expansion of our business continually creates openings for alert, energetic young men of good character, appearance and address to be trained as retail Hoover salesmen. Many of our men

Earn $200 to $600 per month

The average runs $200 to $250. Some make $500 to $600, however. It is simply up to the man and how willing he is to be taught the best methods of selling. You sell the best known, best advertised and best cleaner. We train you free and pay you liberally. Excellent opportunities for promotion. Apply in person at Hoover district offices in principal cities (consult phone book) — or by mail to factory. There may be an opening right in your locality.

During 1921, in Walkerville, Ontario—a city of 2,955 wired homes—the Walkerville Hydro Electric System sold 86 Hoovers valued at $6,087.50.

During the first half of 1922, however, they sold 135 Hoovers worth $8,590.50! This is at the rate of about three times their last year's sales.

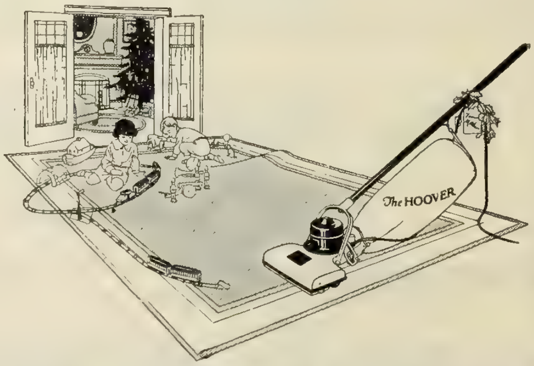
This Utility operates on the famous Hoover Co-operative Plan, as do so many other prominent retailers. Under this arrangement the trained Hoover sales organization—working closely with the dealer—secures leads, demonstrates, sells, delivers and services the cleaners.

A Hoover demonstrating table is placed on the aisle along which people must walk to pay their bills. Hoover window displays, Hoover advertising in local papers and special Hoover sales campaigns are also used to interest the public.

Why don't *you* take advantage of the long experience the Hoover organization has had in the successful sale of electric cleaners? Why don't *you* find out just what it can do to increase *your* business?

A representative will gladly call—without obligation. Send for him.

THE HOOVER SUCTION SWEEPER COMPANY OF CANADA, LIMITED
Factory and General Offices: Hamilton, Ontario



The HOOVER MADE IN CANADA

It BEATS ... as it Sweeps ... as it Cleans

Electrical News
Generation, Transmission and Application of Electricity

For nearly thirty years the recognized journal for the Electrical Interests of Canada

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Orders for advertising should reach the office of publication not later than the 5th and 20th of the month. Changes in advertisements will be made whenever desired, without cost to the advertiser.

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The "Electrical News" will be mailed to subscribers in Canada, Great Britain and British possessions post free, for $2.00 per annum. United States $2.50. Other foreign countries $4.00. Single copies 15 cents. Remit by currency, registered letter, or postal order payable to Hugh C. MacLean Publications Limited.
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Authorized by the Postmaster General for Canada, for transmission as second class matter.

Vol. 31 *Toronto, December 15, 1922* *No. 24*

No Political Interference—Guaranteed by Dominion Government

The outstanding event of the past week was the arrival in Canada of Sir Henry Thornton, the new president of the Canadian National Railway System and his general statement of policy as outlined at his first public appearance at a banquet given in his honor by the Montreal Board of Trade.

It was not expected that matters of policy would be outlined at this early date, but that Sir Henry would take this first opportunity of enunciating the basic principles upon which the National system would be operated was naturally looked for. The definiteness of the enunciations will leave no doubt in the public mind on two points: (1) That he has already grasped the fundamentals and (2) that, having outlined his general plan, he will adhere to it.

What the people of Canada have been hoping and praying for is a man with sufficient ability and strength of character to assume just as absolute a dictatorship of the nationally-owned lines as is exercised, for example, by President E. W. Beatty for the C.P.R. The theory of national ownership is sound enough. The difficulties lie in practice. We must all recognize that in addition to the usual and inevitable problems to be solved in the administration of an enterprise of such dimensions and complexity—common to both private and government ownership—there are innumerable snares besetting the pathway of the man who is constantly being importuned, at the same time, to steer his course according to the dictates of this or that political or sectional influence. The people of Canada know by experience and it is gratifyingly evident that Sir Henry Thornton knows, that such a course spells failure.

* * *

Two main points were brought out in Sir Henry's address. The first was that he looked upon the Canadian National Railway System as differing, fundamentally, only in minor detail from the C.P.R.—the number of shareholders. Shareholders of the C.P.R. number thousands; there is only one shareholder of our national system—Canada. Further than this, his relation to his single shareholder was almost identical with Mr. Beatty's relationship to his thousands of shareholders—he had been given carte blanche, absolute administrative control.

* * *

The other point made by Sir Henry, and most emphatically made, was that there would be no political interference. His words in this respect are worth quoting:

> **"But let it be emphatically understood now—once and for all—that there is to be no political interference, direct or indirect, in the administration and working of the Canadian National Railways. I cannot put it any more forcefully without transgressing the rules of polite speech, and if I knew of any words which would make this point more clear I would unhesitatingly employ them. The prime minister has solemnly assured me that there is to be no political interference, and it was with this distinct understanding that I accepted the post which the government has done me the honor to offer. This assurance is the only assurance that any government, irrespective of political complexion, would be compelled to make under similar circumstances. It is vital to the success of our railways, and any other procedure spells inevitable disaster."**

Of course we have all heard this kind of talk before and we all know, in spite of such protestations, how fatal to many of our publicly owned enterprises the interference of "politics" has proven. Some way or other, however, Sir Henry looks, and his words are phrased, as if he means what he says. If he does, and if he has a sufficiently strong character to stand or fall on that declaration, he will find that irrespective of political inclinations, or racial or sectional aspirations, the people of Canada will stand behind his efforts and give him their moral support.

* * *

Another ray of sunshine shone in upon this eventful gathering in the statement by Sir Joseph Flavelle that there will be no operating loss on the Canadian National System this year. Not only will operating charges all be met but there will be a "substantial" surplus to apply to fixed charges. As Sir Henry Thornton expressed it, this is an evidence that the system will "respond to treatment."

From a national point of view we look upon Sir Henry Thornton's active assumption of the control of the Canadian National System as an epoch-marking event. Canada is in the making and whether, in the near future, she shall be counted "big" among the other nations of the world depends in great measure on her transportation systems. Thornton and Beatty hold the keys to the situation and Canadians look to them, and expect them, to make good.

Honor!

GREAT BRITAIN is going to pay to the last farthing irrespective of whatever any other debtor nation does. England moved first in the matter of debt settlement, even before the people of the United States realized that nearly half their war debt represented loans to the Allies. England moved promptly because she meant to pay and to collect from her debtors if possible.

The majority of people in this country do not understand the word "honor" as respects debts and endorsement as the English understand it.

If an Englishman introduces a friend to his tailor, it is as an introduction to his club; the introducer is responsible for any debt.

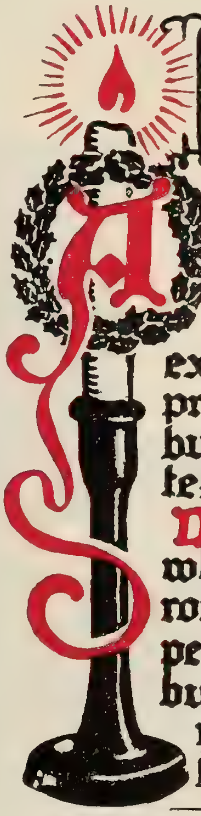
The tendency of this country is to regard the tailor, the butcher or the grocer, or the merchandiser of any sort, as indebted to the introducer for a new customer.

If bank officials or bank directors were held responsible for the introduction of new customers, larger salaries would have to be paid and business might be very much restricted.

One of the largest banks in New York was not long ago surprised because the youngest director on the board promptly stepped up and paid the debt to the bank of a young merchant who had failed.

The bank director said "I introduced this young man to the bank for credit, believing in his ability to make a success of his business. For a time he made a very decided success and appeared to be above the ordinary in the intelligent handling of his business. Then came the big shrinkage in values which swept him over. I believe the bank extended this credit because of my introduction and though I don't believe, generally speaking that directors should be financially responsible for bank introductions, I felt I had a personal responsibility in this instance, which I could not overlook.

Barron's Weekly (*N.Y.*)



Appreciation

And now, in the friendly spirit of a merry Christmas, accept this expression of appreciation for your business and courtesies of the past. May that light which illumines the road to health, prosperity and happiness burn steadily for you through all the New Year.

Hugh C. MacLean
Publications

The Application of Electricity in the Manufacturing Industry--12

Flour Mills' Electrification Rapidly Increasing —Other Types of Drive Unsatisfactory on Account of the Care Necessary in Manufacture

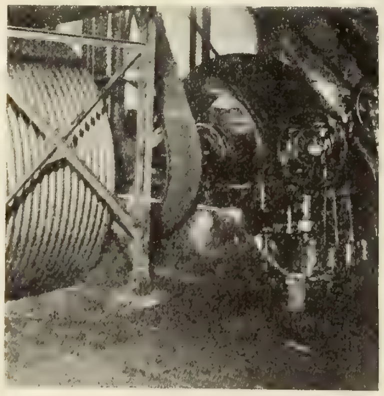
The modern flour mill is built for the purpose of converting grain-stuffs into flour. Present day mills range in size from those which convert only a few barrels a day to those having a daily output that ranges well into the thousands; regardless of their capacity, however, the operations performed are practically the same.

The processes employed involve a seeming multiplicity of treatments, but the main objectives may be classed as cleaning, tempering, separation of middlings and reduction to flour. These operations are all of a semi-automatic nature, and the product is not touched by human hand from start to finish, being passed from operation to operation through spout conveyors.

Electrification Increasing

The major considerations of operating costs and reliability are resulting in the electrification of increasing numbers of flour mills.. Such installations are demonstrating that in most cases a properly electrified mill or elevator can be operated at a lower cost per unit of product and with greater reliability than can be obtained with other kinds of power.

The majority of the smaller mills* are at present being driven by steam engines. Unless coal and labor are very cheap the steam engine is not particularly economical because little steam is used for process work and in most of these installations the size of the engine and available water supply does not warrant a condensing unit. This means a non-condensing engine and many dollars blown into the air in the form of exhaust steam.



Main shaft with ball-bearing installation

It is usually the practice to use one engine to drive the entire mill. This means a great deal of heavy line shafting and if the alignment of bearings is not maintained if there are accidental distortions or imperfect lubrication, the journals become overheated and the fire risk is appreciably increased. With such an arrangement a large number of belts is necessary, the maintenance cost is high, and in addition there is a tremendous friction loss in the transmission system. These things naturally follow because a steam engine drive is not flexible and does not permit subdivision of the machinery into small groups.

Steam Drive and High Insurance Rates

A 50 h.p. induction motor suspended from ceiling—driving chop mill

The ordinary steam engine drive makes it necessary to have a boiler room dangerously close to the mill or else to have heavy losses in long rope drives or steam mains. Unless this boiler room is installed in a fireproof building the insurance rating is increased—about 15 per cent in the case of stone or brick mills, and about 50 per cent in the case of frame buildings—above the rate for properly electrified mills. The engine room, boiler room and main transmissions are all unnecessary in a modern electrified mill.

In mills driven by water power the more evident disadvantages are limited capacity, requiring sooner or later to be supplemented by some other power, reduced capacity or possible shut down during the dry season due to lack of water, and in some cases similar trouble in flood seasons due to back water in the trail race. In such mills the speed regulation is generally poor and the power losses in heavy main transmissions, the high maintenance costs of belts and ropes and the difficulty of enlarging the mill have caused many of these water-driven mills to adopt electric completely or as reserve for break-down service.

Advantages of Electric Drive

Where electric motors are used it is possible to divide the machinery into groups and do away with the main heavy transmissions. The fire danger is reduced because there are fewer bearings to overheat and no flames for explosive dust to come in contact with. The receiving or cleaning machinery may be operated without driving the flour milling machinery and the packers, conveyors, car pullers, pumps and fans are only operated when there is actual need for them.

The saving in power, which would otherwise be lost in belts and shafting, is evident. When additions are made to the mill, the new machine can be set up and connected to its own motor without in any way interfering with the operation of the original equipment. In mills grinding both flour and miscellaneous feeds it is easy to operate only one part of the mill without driving all of the shafting in the other parts and without running the main engine at a small percentage of the load at which it is rated.

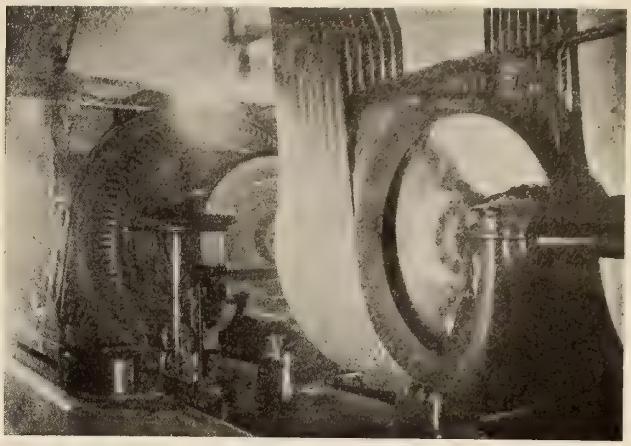
It is estimated that a speed variation of not over two per cent is the limit for mills producing the best grades of flour. With properly grouped electric drives, belt slippage is eliminated to a great extent, and the milling machines are kept more closely up to their proper rated speed, thus increasing output as well as improving the quality of the product. The speed of the motor can be kept constant so that the danger of slowing down and choking is practically eliminated.

Provisions for Stopping Previous Operations

Since the milling process is continuous, provision must be made so that if any machine, elevator or conveyor stops, all previous operations in the sequence will stop so as to prevent choking the system. The milling machinery may all be driven by one motor or the control of a number of motors may be brought to a common panel and wired so that all motors in a group will start at once or in their proper order, and so that if one motor stops all other motors preceding it will stop also. This arrangement is very simple and with it the mill can be started up in much less time than is the case with a steam driven mill. Push button stations may be located at convenient points so that an entire mill section may be stopped by simply pushing a button at any one of them.

In the grain elevators, electric drive is particularly applicable. The motor or motors can be located close to the machinery, again cutting down belt expense and power losses in transmission. Ordinarily motors are supplied for each elevator leg, car puller and exhaust fan, while the cleaning machinery such as separators, small screw conveyors, dust collectors, etc., when compactly grouped are driven together by single motors. Motor driven fire pumps may be made to operate automatically or be manually controlled from a distance. It is unnecessary to maintain steam continually for these operations; the motor is not dependent upon the location of boilers and steam pipes, and may therefore be installed at the most favorable location for the work it has to do.

Practically all motors used in flour mill work are of low or moderate speed and are designed for constant speed service. If a single motor is used without a friction clutch for a group drive it should be of the slip ring type, if alternating current, or compound wound direct current, but if a friction clutch is used the motor may be either of the synchronous or squirrel cage type. The most common arrangement for group drives is the use of the squirrel cage motors with a friction clutch where that is necessary.

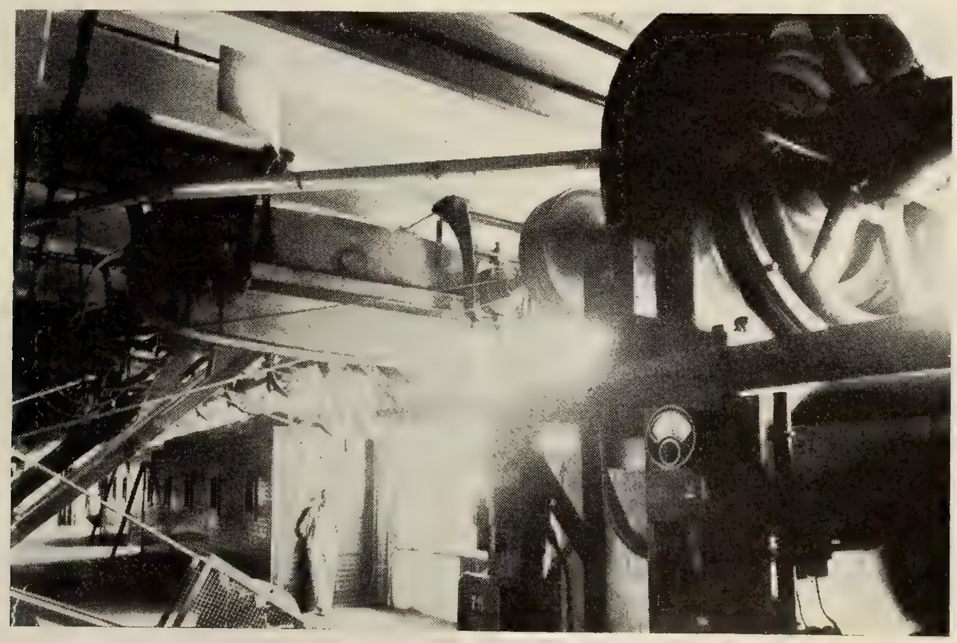


A 600 h.p. 2300 volt synchronous motor with rope drive

The use of motors not only reduces the friction loss but cuts down the first cost of shafting and belting, reduces the labor costs of maintenance, replacement and repairs, and results in cleanliness and safety in operation beyond that obtained with other drives.

An electric motor is comparatively compact and it is not usually necessary to provide special foundations for the sizes most generally used in flour mills. In case of new mills or elevators the adoption of the electric drive reduces the cost of building construction because it is not necessary to build engine rooms, boiler rooms or to provide supports for heavy line shafting, hangers and pulleys. The elimination of fire risk is evidenced by lower insurance rates for properly electrified mills.

An examination of many typical mills has disclosed the fact that, in the majority of cases, the illumination is very



Quaker Oats' Plant, Peterborough, Ontario—400 h.p. ball-bearing motor, direct connected to lineshaft poor, consisting mainly of low wattage lamps on drop cords placed where the light is desired.

The dust trouble has to be considered as a very important fator. Lighting units become rapidly coated with a dense layer of more or less inflammable and opaque dust. Some of the modern mills apply low wattage lamps in vapor-proof globes, using rigid mountings. This secures fairly good illumination, but this practice is not universal, and there is a large field in this industry for the use of higher wattage lamps in conjunction with vapor-proof globes equipped with reflectors and, where necessary, guards affording protection from mechanical injury.

Evidences of the advantages and satisfaction of electric drives are not hard to find. Here is the opinion of an Ontario flour miller:—

Mitchell, Ont.

Editor, Electrical News:

Electrical motor drive was installed in the mill here in October 1911—two motors, each 50 h.p., one on the flour mill and one on the chopping plant. Thic makes it possible to run each unit separately if desired. The motors have been in constant use ever since and have not cost one dollar for repairs. They are placed on a cement foundation and belted to the main shaft of each section. They are very convenient to start, no delay to raise steam or clean out racks or cut ice (if using water power). The uniform motion makes the electric drive particularly desirable for flour milling because many of the separations are made with suction fans and any change in speed affects the separations and consequently the results. The one draw-back is that the current may go off suddenly and stop the mill without warning, which does not leave it in good shape for starting again.

Yours truly
Stuart Bros. Ltd.

Possibilities of Electrification

At the present time there are in Canada 1,332 individual flour milling plants. These are distributed by provinces, as follows:—

Ontario	617
Quebec	457
Alberta	58
New Brunswick	50
Saskatchewan	45
Manitoba	44
Nova Scotia	32
Prince Edward Island	24
British Columbia	5

The most recent figures available as to the amount of capital invested in the industry show a total of $68,838,927. Of this amount $15,068,491 is represented by machinery and tools. With complete electrification of mills, it is apparent that a large part of this latter figure would represent electrical machinery.

Some indication of the extent to which steam power is used is furnished by a knowledge of the fact that 88,552 tons of coal were used in one year to raise steam for power purposes in this industry. A tabulated form showing the use of various fuels for steam raising purposes for one year is as follows:—

Expenditures for Fuel in Flour Milling Industry

Coal (all kinds)	$552,160
Gasoline	27,000
Wood	45,000
Other fuels (gas, etc.)	42,000
Total	$666,160

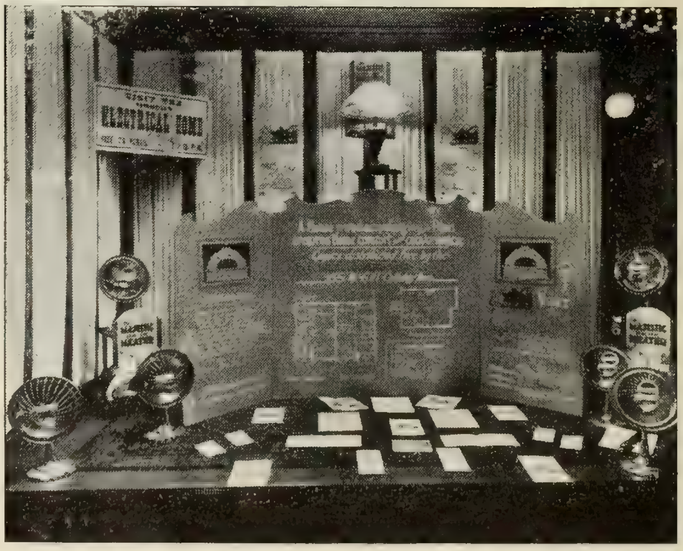
It must, of course, be considered that in some cases, electricity is generated with the fuel expenditure. A better idea as to the extent of electrification is given by the following table:—

Kinds of power used	Number of units	H.P. according to manufacturer's rating	H.P. actually employed
Boilers	231	17,828	12,706
Engines, steam	227	17,871	14,921
gas	47	3,134	2,696
gasoline and oil	181	3,331	3,202
Waterwheels or turbines	1,134	44,106	37,029
Water motors	8	321	295
Electric motors	1,135	50,812	38,220
Other powers, not specified	4	270	100
Total Power	2,736	119,845	96,463

The power employed in the industry is shown by kinds or classes in the power statistic table, according to (a) the number of units of each class, (b) the total horsepower according to manufacturers rating, and (c) the horsepower actually employed.

A consideration of the figures given above cannot fail to show that there is a large field for electrification in the flour milling industry. The conversion is coming, but slowly. A campaign of education, the exposition of the lower costs made possible by electrification, will hasten the process. The miller must be shown that the simple construction and high efficiency of the motors used insures the closest approximation to maximum, overall efficiency, and consequently insures a minimum of wasted power.

An automatic electric sub-station is to be built immediately by the B. C. Electric Railway Company on Bodwell Road at a cost of $65,000 including equipment. It will house the usual transformers and a rotary converter of 1,000 kilowatts capacity, supplying the railway lines of South Vancouver with current at 550 volts.

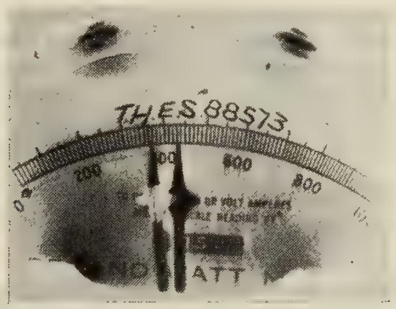


A window-full of suggestions for the man and woman planning a new home. The secretary-manager of the Montreal Electrical Contractor-dealers' association will advise regarding general plans, wiring, outlets and fittings so that the home may contain a maximum of comfort and convenience.

Photographic Method of Meter Reading Prevents Disputes With Customers

New System Includes Photographs of Each Meter Face—Quickly Taken—System Engenders Goodwill—Many Savings Involved

An innovation in meter reading, by means of which a photograph of each meter face is taken, has been recently adopted by the Toronto Hydro-electric System. So far, this system has only been used on demand wattmeters, but it is quite applicable to any meter on the company's lines. The great point of the system is that the meter is read with photographic fidelity, and an indisputable record is brought to the office files. There have been no disputes in this case, but if such should occur, the records are at hand, being the means of transporting monthly to the office shelves all the meters on the company's mains.



A typical reading on Toronto Hydro-electric System

The photographs are taken with a special camera, equipped with an anastigmat lens of short focus, a simple automatic shutter controlled by the operator, making exposures with varying speeds as fast as one-fifth second, and lamps for furnishing light for the exposure. The actual photo is obtained with the front of the camera against the meter dial and pressing downward on the exposure lever. This action automatically turns on the light, opens and closes the shutter and turns off the light. This shutter, with each exposure, automatically locks until the film for the next exposure is wound into place. This prevents the possibility of a double exposure; that is, the superimposing of one exposure upon another. Likewise there are no blanks, for the film cannot be wound off until the exposure has been made. Winding reel and exposure level are mutually interlocking, thus eliminating the possibility of error from forgetting to turn the key or from turning the key before the exposure has been made. Identification of the meter is obtained by stamping on the outside of the glass dial the meter number. The light is furnished by two four-cell dry batteries stored in either side of the camera, supplying current to four 3.8 volt Mazda miniature lamps.

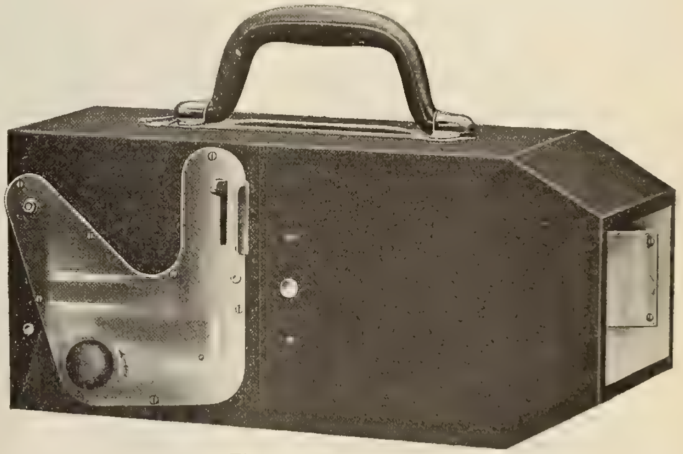
The exposure is recorded upon a special sensitive emulsion coated on a paper support and by a reversing feature in the camera a positive reading is obtained direct from development, which does away with any necessity of making prints from the exposures. The exposures are 1½ by 2⅛ inches and are spooled in the familiar daylight loading cartridge form with 75 exposures to each roll. When the last exposure has been made the shutter, by a special cut in the film, remains locked until the film is wound off and a new spool has been inserted.

A small drawer is provided in the front of the camera to carry five extra lamps and the camera is equipped with a convenient, reinforced handle. By pressing a small button that is located just below the exposure lever the lights may be turned on, converting the camera into a "flasher" for locating meters or finding one's way through dark cellars.

The development is the simplest part of the whole operation and any one of the meter readers can do the developing for the whole field force. After winding on racks the films are immersed in the developing tanks, where they remain for two minutes and after development are rinsed and then immersed in the fixing tank. After fixing and a short rinsing they are slipped in wall racks for drying. When dry they are re-spooled and are then ready for the bookkeepers.

The fact that the developing, fixing and rinsing are all done on the one rack, greatly simplifies the operation, so that on an average only three minutes are necessary for each roll. As all developing can be most economically done at night, no expense is necessary in the way of dark room equipment—any blue print room or other room with large sink affords the necessary facilities.

The adoption of this system shows customers that the power company is endeavoring to obtain the most accurate readings possible, and engenders a goodwill and confidence that is a desirable asset.



The Factograph Camera

It is claimed that some expenses are eliminated by this system. Such items as the annual cost of heading up the meter readers' lists, the annual cost of flash lights including lamps and batteries, the actual time spent in re-reading doubtful meters, and from the elimination of complaints, may be counted on the saved side.

The fact that some meters are above sight level beyond the reach of the readers from the floor may seem objection, but statistics show that the majority of mistakes in reading are made in these "skied" meters.

The cost of using this system varies with the different companies, depending upon the number of meters read, the size of the reading force and the number of days consumed in reading.

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*From information supplied by T. R. Flint, Toronto Hydro-electric System.

Are Cooking and Water Heating Desirable Additions to Station Load?

Claim is Made That Diversity Factor is Much Greater than Generally Supposed

By W. F. CLARKE*

During the past few years there has been much doubt and discussion among central station managers as to whether the electric cooking and water heating load should be encouraged. A lack of accumulative, definite and convincing operating data indicating the practical diversity and actual station, line and transformer capacity required has contributed to this feeling. The energy required per customer has also been a somewhat indefinite quantity. Central station men as a whole, due to their lack of experience and definite knowledge of the cooking and water heating load, have not considered it safe to trust the figures as to diversity. There has also been a general fear that development and experience would demonstrate that electric cooking would be either too expensive to the customer or so costly to the distributing company as to make the load undesirable.

More extended experience, however, has demonstrated that where the cooking and water heating load is developed to any considerable extent, the resulting diversity is much greater than generally believed possible. In fact, with any considerable development of cooking and water heating load on the generating station and general distributing system, this diversity, in terms of maximum capacity of the stoves and ranges, is not less than 1 to 8 and in many cases in excess of this figure. In groups served from a single transformer where three or four electric ranges are supplied it seems safe to allow one-fourth to one-third of the connected range load as the transformer capacity required for combined lighting and range load. If several water heaters are to be installed with a double-throw switch so that cooking and water heating demands are not coincident, possibly three kilowatts per range should be allowed.

Transformer Capacity Per Range

The Washington Water Power Company of Spokane, Washington, which has had much experience in servicing electric ranges, is reported to allow but two kilowatts per range to cover necessary transformer capacity. On the other hand, the Puget Sound Power & Light Company, with a smaller number of ranges, allows as high as three kilowatts per range. It will be noted that on the Washington Water Power Company basis of only two kilowatts, 25 per cent of a range rated at eight kilowatts maximum is allowed as the effective individual demand.

The concensus of opinion of those who have operated a large number of ranges indicates that where several ranges are grouped on the same transformer this allowance is sufficient. The fear that on the average the lighting load would materially lap over the cooking load seems to be unwarranted by actual operating data. Unlike the motor load the range load, due to constant resistance, with reduced voltage decreases the ampere flow and consequent heating effect on the transformers and operates at practically unity power factor. This, with the diversity from several services, usually safeguards transformers against overloads.

High Practical Diversity

While it is true that it may be possible to operate an individual range at maximum rated capacity, in fact this condition seems seldom to occur and is safeguarded by the diversity if several customers are served from the same transformer. While we might expect that the general customs of the community would regulate the times of usage, further experience indicates that there is great variance in time of usage by individual families resulting from the variation in personal habits, day to day needs and resulting working methods. This variation is much greater than anticipated and no doubt has much to do with the high practical diversity which is being demonstrated by the records obtained where a comparatively large number of stoves have been installed. These effects are well illustrated in the recent report of the Merchandise Sales Bureau, Commercial Section, N. E. L. A., at Atlantic City.

In the case of farm lines it is obvious that the transformer requirements for the range will need to be approximately equal to the maximum capacity of the range, although if two families are served from the same transformer this amount can be somewhat reduced. This requirement, however, generally applies only to the local service line and transformer which are only a portion although a considerable part of the total investment expense per customer.

Allowable Diversity Ratio

When we come to consider the resultant demand upon the substation or generating station and on the feeders between generating stations and center of distribution and for a reasonable development, in getting at necessary costs of service on the basis of maximum range capacity connected we can allow a diversity ratio of at least 1 to 8. In other words, if this part of the system, including generating plant, costs a total of say $265.00 per kilowatt, only one-eighth of this amount, or $33.00 per kilowatt of range demand needs to be considered in arriving at final costs for this part of the total investment required to serve the individual customer. It seems evident, however, that with a high development of town service the diversity may be much better than 1 to 8. In the case of the rural line the lack of local diversity can be safeguarded by a higher guaranteed minimum charge for the service.

The electric cooking and water heating business is a field of development in the electrical industry which is still so young as to be yet in the formative stage.

The most effective way in which to treat it, is to gather together and co-ordinate information as to the progress in development of this class of business during the past year, and profiting by past experience point the way to greater uniformity and encouragement of this business in the future.

Power Company Experience and Policies

It is evident from the reports received that most of the larger and some of the smaller power companies now see the possibilities and ultimate value of this load, but it would seem that many of the smaller and a few of the larger are still in doubt as to the advisability of encouraging it.

Many have established rates and regulations that make this load possible; some being very attractive and opening up a wide field, while others are such as to limit the field. On the whole, it would appear that substantial progress is being made in the education of the power company men as to the satisfactory results that can be obtained with present day cooking and water heating appliances, the great service that can be rendered the public, and the large increase in revenue possible by the building up of this service.

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*General manager, Automatic Electric Heater Company.

Possibilities of the Domestic Load

In considering the desirability of cooking and other possible household loads we should not overlook the fact that 80 to 85 per cent of public utility customers are residences and that if lighting alone were furnished on this service, the average annual usage the country over would not exceed 200 kilowatt hours per customer. In connecting up these residence customers for service it is evident that the utility makes a definite commitment not only for a proportionate part of the generating plant, distributing system, ,etc., and for meters and service, but the utility also assumes even for a lighting customer as annual cash expenditure of $7.00 or more per customer to compensate for individual service in the form of office labor, reading and maintenance of meters and ordinary service attention.

With the general application of the flatiron, toaster and similar devices which are now to be found in the majority of residences, there are occasional but not necessarily coincident individual demands on the service from 500 watts to 1,000 watts per customer. The effective local demand for a group of customers may, of course, be considerably less, due to the diversity incident to the various and non-coincident times at which customers utilize these devices.

It is probable that if we would confine the usage to lighting alone, the effective demand per residence would not exceed an average of 250 watts or less per customer. As various small cooking and heating devices are purchased and come into more general use, the kilowatt hours sold per customer will slowly increase even without special merchandising effort on the part of the distributing company, but this procedure is much too slow.

Lighting Alone Not Profitable

It is obvious from the above that when the supplying company connects up a residence lighting customer it cannot expect to profitably operate on lighting alone. This condition is especially apparent if we divide the sum of all the enumerated yearly costs by the number of kilowatt hours sold per annum for lighting only. It immediately becomes apparent that the high kilowatt hour charge in the case where lighting alone is served is more than justified. If, however, we can greatly increase the number of kilowatt hours sold per customer and without as greatly increasing the additional capacity required in transformer and services and even less in other portions of the system, it is evident that to obtain this additional business we will be justified in making a much lower rate for these additional kilowatt hours.

A central California company reports a revenue for 1921 of approximately $195,000 from the domestic and commercial electric cooking and heating alone. This company is one that fully appreciates the possibilities and is lending every encouragement to the building up of the heating and cooking load. On this system the customer has the choice of combining lighting, cooking and heating on one meter, or having the lighting on a separate meter. He is also permitted to include motors not in excess of 5 h.p. on the heating and cooking meter.

Ye Electrical House-Keeping Shop

The National Electric Heating Company give their dealers some very valuable sales' settings. The fire-place illustrated is one example. This particular picture is a photograph of the window of the "Electrical Housekeeping Shoppe" an attractive little store up on St. Clair West, Toronto. F. R. Goldsmith is the proprietor.

Electricity in Port of Montreal

Mr. T. W. Harvie, chief engineer of the port of Montreal, in a paper before the Engineering Institute spoke of the harbor development, which is virtually the story of Montreal's growth to metropolitan stature.

To-day it is one of the greatest grain exporting cities in the world, and though one thousand miles from the sea, due to its admirable position is a great inland port.

Among some of the newer features of the harbor Mr. Harvie spoke of a complete electric power plant which lights the entire port and from which power could be derived to electrify sixty five miles of harbor railway terminals, operated by the Harbor Board, and which will serve every shed, and berth, and provide access to every port of the harbor for all transcontinental railways in the Dominion. The electrification of the tracks is close to completion, when over 1,800 cars per day will be handled.

It is interesting to know that Montreal now has 7th place amongst the great shipping cities of the world, New York, Liverpool, London, Hamburg, Antwerp and Marseilles in the order named still standing ahead. It is hoped with the addition of the new cold storage plant at a cost of $2,250,000 to the harbor, and the gradual development of the Canadian and the American West to which Montreal is connected through a complete system of canal, river and lake navigation and through which a corresponding great increase of shipping is sure to come in cold storage exports the capacity of the harbor will better her present proud position.

Mr. Harvie, speaking of future developments, considered it was time to formulate a new plan covering a number of years which could be carried out in a systematic way.

"Electrons"

At a recent meeting of the Toronto section A.I.E.E., the speaker of the evening was Dr. J. C. McLennan, of the University of Toronto.

Dr. McLennan is a very simple manner showed, relatively, the size of an atom, explained how its mass was arrived at, and how each atom contained electrons or cathode rays, these electrons being negatively charged particles about 1/2000 times the weight of the smallest atom and revolving around a nucleus or positively charged electron at the centre of the atom. He gave the mass of the electron as 9 x 10^{-28} gram and that of the atom 1.64 x 10^{-24} gram.

He explained how the current in wires is carried by negatively charged electrons, how electrons are flying off heated filaments of metal all the time and that radium gives off electrons at ordinary temperature, being replaced in part by the electrons from the atoms comprising the gases in the air. In this way radium makes air a conductor.

He showed how electrons get an added mass from the ether as they are projected through it with high velocities and have no mass of their own except an electric magnetic mass. He showed how the nucleus of a lighter atom striking that of a heavier one is deflected.

The address, illustrated by experiments and slides was a revelation to those present and gave an idea of the importance of the subject and the amount of knowledge being gained of the structure of matter.

Power Developments in Northern Ontario

The Great Northern Power Company, formerly the Matachewan Power Co., are actively working on the provision of power in the Northern Ontario region. This company is placing on the market a new issue of $850,000 first mortgage 7 per cent sinking fund bonds, due in 1937. This initial bond offering is being made to cover the cost of installing the first three units.

The power sites of the company are so located that they are in a position to supply many of the camps north of the Cobalt district, including Porcupine, Kirkland Lake, Matachewan and Shining Tree, in the gold zone, and Gowganda in the silver producing zone.

Transmission lines are being erected by those mines with whom contracts are taken out. The mines bear the cost of the transmission system, which will be repaid to them through rebating a percentage of the cost of the power they consume.

In Matachewan and Shining Tree no Power is at present available, even for carrying on development work, as the result of which the development of the district is seriously retarded. The only power possible is steam, the cost of which is prohibitive. All the available power in the Porcupine field is taken up and there is a demand for a greater supply. Some steam power is being used which is said to cost from $300 to $500 per horse power per annum.

Production of Electric Steel

An interesting summary of the situation as regards the production of electric steel was recently made by the National Bank of Commerce in New York. It is pointed out that this particular application of electricity is a development of the last decade since in 1913 the world output was 170,000 tons. Today it is slightly less than 400,000 tons..

During the war a considerable impetus was given to the electric production of steel and in 1918 the total ran well over a million tons. This had dropped in 1920 to about 800,000 tons and in 1921 to about half this amount. Difficulty of obtaining figures for German and Eastern output renders a correct total in later years impossible.

Up to the outbreak of war Germany was the chief producer of electric steel. At the present time the United States would appear to be greatly in the lead, with Italy a close second. On January 1, 1922, there were close upon 400 electric steel furnaces operating in the United States with about half that number in Italy. Germany has at least 100, though the exact capacity and the exact output in the recent past is not known.

Canada has not been a prominent factor in the production of electrical steel though we are one of a group of eight countries where electricity is used for this purpose. As pointed out in the article to which we refer, production of electric steel in large quantities is only possible in countries having abundant water power. Judged on this basis Canada is scarcely figuring as prominently as she should do. It is one of the problems to be considered in connection with the further development of our immense water powers.

Prevention of Accidents

At a meeting of the Toronto Section A.I.E.E., on November 24, the subject discussed was "Modern Electrical Practice to Prevent Accidents." Mr. Wills MacLachlan spoke on the subject in general, referring particularly to Compensation Board awards for employees' resuscitation, electrical burns and low voltage shock. Mr. Amos spoke in connection with electrical stations and mentioned a number of items of good practice pertaining to kinds of equipment purchased and the layout of the equipment, as well as the building. In connection with industrial plants, Mr. F. R. Ewart pointed out that all up-to-date layouts included safety lighting cabinets, safety starting switches and wiring in conduit. The main item was proper maintenance by qualified parties and the education of industrial operators to leave all things electrical strictly alone. Mr. Brady spoke in connection with overhead lines and covered up-to-date methods of spacing, grounding, guying, buying poles, etc., according to specification.

Mr. Moffat took part in the discussion by giving a description of the propaganda being carried on by the Bell Telephone Company to prevent accidents. They had First Aid Classes; they kept prominent records of all accidents and expended much effort to bring home to as many employees as possible the cause of each accident and ways and means to prevent same in future. Mr. Frank Groome gave some insurance company records of accidents due to poor illumination and mentioned a number of definite cases to show how such accidents occurred. Mr. Wills MacLachlan with the help of Mr. Mulligan and Mr. Moat gave a demonstration of resuscitation by the Prone Pressure Method.

Contributions to the discussion were also made by Messrs. M. B. Hastings, W. Mulligan, W. Volkman, A. B. Cooper, H. C. Powell, Mr. Harris, R. B. Weir and E. R. Lawler, while the speakers replied to a number of questions.

Electrical Production of Fertilizers

By P. M. Dearle

An Italian electro-chemist has just patented a process which seems likely to be of considerable importance in the development of Canadian agriculture, aiming as it does at the economical production of fixed nitrogen from the air in the form of chemical fertilizers. The time is approaching when in Ontario and Quebec at all events our agriculturists will need to take a leaf out of their books of their French, Belgian or German cousins and to spend an appreciable sum annually in adding to the soil those valuable chemical salts extracted by constant cropping. The supply of nitrates for fertilizer purposes is divided for the most part between the vast natural deposits which are the monopoly of Chile and Peru and the output of the huge chemical works run on the dangerous expensive Haber process by the great German chemical trust at Oppau and Merseburg on the Rhine.

Signor Casale, in Italy, hit upon the simple but at that time entirely novel method of producing hydrogen electrolytically from water vapor and converting it—with nitrogen obtained also electrolytically from the atmosphere—into ammonia which is subsequently converted into ammonium salts of various kinds at a cost only one-fourth of that involved in Germany where comparatively cheap coal supplies are to hand.

Especially Applicable to Canada

The particulars of the process of manufacture have, of course, been patented, and rights are being disposed of for practically every country in the world in which hydro-electric power is available. A remarkable feature of the process is likely to be the utilization in the construction of the apparatus of a new alloy-steel, Vibrac—of English manufacture, which gives the necessary strength to withstand the explosions taking place in the course of the chemical reactions with a weight of material much less than would be possible if ordinary steel vessels were used.

Apparatus Light and Simple

It is claimed that the apparatus required for the Casale process can be made so light and simple that its installation at remote waterfalls in agricultural districts should be a matter of but small difficulty, thus affording farmers a locally-produced supply of artificial fertilizers at an expense of one-fourth of the production cost by the Haber method, and eliminating also the heavy charges for transport involved in bringing the fertilizers from port or factory to the centre of distribution. While the supervision of a fertilizer plant would necessarily involve the services of a trained electrochemist, there is little doubt that in many parts of Canada where existing industries use hydro-electric energy intermittently, and there is consequently from time to time a surplus of power available for other purposes, the manufacture of synthetic ammonium fertilizers will be found a valuable source of revenue.

New Light Plant in Magnetawan

Daley Bros., Magnetawan, Ont., have installed a new lighting system in Magnetawan, Ont., a village situated on the Magnetawan River. The construction includes an open timber flume 150 feet long leading to a frame power house 16 ft. by 22 ft. in which is installed a 50 h.p. vertical type turbine, operating under an eleven foot head, belt connected to 75 kv.a. two phase, 2,300 volt generator. The generator is located in a separate room 14 ft by 16 ft.

The distribution system covers a mile of street with 2,200 volt primary 220 and 110 volt secondary. The distribution equipment includes two 5 kw. line transformers and 20 street lamps of 75 or 100 watt capacity, nitrogen type.

In a separate compartment adjoining the power-house the company also operates a 24 ft. Robinson grinder which is driven from the main turbine and serves the immediate district in grain grinding. This equipment was placed in operation on November 15 of this year.

Power Situation in St. John

The contract between the City of St. John and the New Brunswick Electric Commission for a minimum of 10,000,000 and a maximum of 15,000,000 kilowatt hours of electric current per year from the Provincial Development Commission was signed on November 24 by representatives of the city and the commission, payment not to begin until May 1, 1923.

As the recent outcome of the refusal of the New Brunswick Power Company to sell its entire plant and equipment at a price of $2,577,655.—sum set by the Supreme Court in 1920—the common council in committee decided to recommend to council, the establishment of a civic Hydro Commission, as authorized in the New Brunswick Electric Power Act, who will serve for a term of two years, to be composed of the following: Major Ronald A. McAvity, William Harding, F. S. A. McMullin, Herbert Phillips, John N. Flood, James Lewis, and A. M. Rowan.

British Industries' Fair

The Canadian Chamber of Commerce in London has decided definitely to take space at the ninth annual British Industries' Fair, to be held in London and Birmingham from 19th February to 2nd March, according to information received by F. W. Field, British Government Trade Commissioner at Toronto. The Chamber of Commerce will organize sections of the Canadian manufactures both at London and Birmingham and desire the co-operation of Canadian manufacturers in order to make their representation as comprehensive as possible. Applications for space should be sent to the British Government Trade Commissioner at Toronto.

Power Supply of Fort Saskatchewan

The Government of Alberta has recently purchased an engine and generator to be used for supplying electricity to the town of Fort Saskatchewan. The engine was bought from the Kipps-Kelly Company, Ltd., Winnipeg, and is a Vickers-Petters semi-Diesel type, 80 b.h.p., 2 cylinder, 300 r.p.m. It is direct-connected to one 50 kw. Canadian Westinghouse, 60 cycle, 2,300 volt, a.c. generator.

BETTER MERCHANDISING

Taking Our Own Medicine

A FINAL CHRISTMAS THOUGHT:—

During the next ten days the electrical industry of Canada will be united in one concentrated effort.

It will be directed at the general public.

BUY - ELECTRICAL - GOODS.

Just one thought:—

Who is the General Public?

Does it include you and me and every man and woman associated in any way with the electrical industry?

Surely! Then the admonition to you, personally, is: buy electrical goods yourself. Buy, within reason, nothing but electrical goods. Do your part to ensure that every employee in the industry, every wife, son and daughter, every father and mother of every man engaged in the industry, buys electrical goods. Use your influence with friends, relatives and acquaintances to have them buy electrical goods.

Boost for the general good of the whole industry.

Boost because it will make your own position, whatever it may be, more secure.

Boost, finally, because you are 100% convinced that there is nothing else under heaven so suitable, in every way, for Christmas presents as Electrical Goods.

BUY NOTHING BUT ELECTRICAL GOODS.

A Simple Accounting System For the Small Contractor

Jobs Must be Accurately Figured—Accurate Record Must be Kept of All Completed Contracts

By REY E. CHATFIELD,
Secretary-manager Electrical Co-operative League of British Columbia

There are a few bed-rock essentials that no successful contracting business can be carried on without. One of these is that jobs must be properly figured. This was explained in my last article. The next most important thing is that an accurate report be kept of all jobs done. This is nothing more nor less less than the basis of a simple bookkeeping system.

Job No.	Job Cost			Selling Price			Margin		
1.									
2.									
3.									

This can be accomplished by listing all jobs completed each month on a form similar to that printed herewith.

At the end of the month you will have a record of the cost, selling price and margin on each job. By adding the margin column you will have the total gross margin for the month.

From this amount deduct the amounts spent for:—

1. Rent,
2. Salary for Management of Business,
3. Light,
4. Heat,
5. Telephone,
6. Automobile,
7. Office expense—(stamps, stationery, etc.),
8. Advertising,
9. Association dues,
10. Taxes,
11. Depreciation on tools and automobile.

These items are typical of some twenty items that go to make up the expense of running an ordinary business. Some may apply to your business, others may not; however, the larger number do apply to every business.

Then by deducting the total of these items from the total of the margin column you have the net profit for that month.

This system is by no means an accurate accounting system but, for the small contractor, will suffice to show in a rough way the monthly progress of the business.

And, Further—

There is no special connection between the foregoing and what I am going to say now, except that it is in the interest of the improvement of the electrical trade in general.

At the present time the public is being interested in electrical matters more than ever before by electrical home exhibits, co-operative advertising, and other means.

This opens a special opportunity for the electrical contractor. Now is the time to **quit skinning the job** and to **use salesmanship** to sell quality jobs at the right price.

A fair price and a first-class job—that is a better policy than using a pencil and paper trying to cut out this and that.

Vancouver Electrical Contractors and Dealers in Annual Meeting

Tuesday Evening, November 14, 1922 the Vancouver branch of the National Association of Electrical Contractors held their annual dinner at the Citizens Club.

The association attended one hundred per cent strong, and entertained as their guests Mr. Sidney Smith, sales manager of the Canadian General Electric Co.; Mr. W. C. Mainwaring, sales manager of the Northern Electric Company and Mr. Rey E. Chatfield, secretary-manager of the Electrical Service League of British Columbia.

After the dinner a regular meeting of the association was held for the election of officers for the new year. The following officers were elected:—

President—Mr. Earl Jarvis, Jarvis Electric Co., Secretary-Treasurer—Mr. Ralph Graham, Graham Electric Co.

Executive Committee—Mr. Wm. Jenkins, Jenkins Electric Co.; Mr. J. C. Reston.

Delegated to the Advisory Council of the Electrical Service League—Mr. Earl Jarvis, Mr. Ralph Graham, and Mr. P. F. Letts.

My Net Profits?

At the Recent Contractor-Dealer's Convention, C. D. Henderson Suggests the Slogan—"Nineteen-twenty-three Means a Profit for Me"

"Business Financing, is the subject for which I am down on the programme, but that is rather too extensive a subject to cover in the scope of a brief address, and I prefer to narrow my remarks down to one phase of the matter—Net Profits.

"I choose that subject because net profits are the most important element in business to-day. It is absolutely essential to the growth of any business. From another standpoint, also, it is most interesting, because Net Profits is the exact measure of the ability of an executive. It is his score in the game of business.

"I want to divide my talk into three sections: (1) Favorable factors; (2) Unfavorable factors; (3) A few suggestions.

Favorable Factors

"I notice that at this convention there does not seem to have been one word of optimism spoken as applied to the Dominion of Canada, but everyone of us should be thankful and proud to be living in this country at the present time. How many are there who realize that Canadian currency is the only currency that is at a premium in every country in the world at the present time. How many of us study trade conditions external and domestic. Exports are increasing, imports are decreasing. Two years ago our trade balance was against us. To-day it is in our favor. Then, think of the wonderful crop that is being harvested this year. It may not mean as much prosperity to the farmer as was hoped for, on account of the low price, but it is bound to set a huge amount of money in circulation.

Consider, again, the fact that there is no other country in the world that has as large a proportion of wired homes as Canada—numbering close on 800,000. The price of electricity is as low, or lower, than in any other part of the world. The class of work done can set an example to electrical men in foreign countries. As to the volume of business—from records available, it is estimated that within the next five years, there will be $200,000,000 spent in Canada through the electrical trades, $40,000,000 a year. There are very few other lines of business which can compare with this figure.

Unfavorable Factors

Now, with regard to the black side, for there is a black side. There are approximately 1,200 electrical contractor-dealers in Canada. According to Bradstreets, only 5 of these are rated at $50,000; 35 are rated from $10,000 to $25,000; 100 from $5,000 to $10,000; 200 from $1,000 to $5,000; 250 from $500 to $1,000; and 600 are rated below $500. Think of it! Fifty per cent. of the men in the business rated at less than $500.

It's not a very creditable situation. Whose fault is it? The greatest fault lies right with ourselves. It is the result of this cursed thing called price-cutting, which applies chiefly to wiring. The appliance manufacturer fixes a certain mark-up which is fairly well maintained, but when it comes to the wiring end of the business, the contractor is not making enough money.

The Jewellers' Overhead

We have been trying to drive home the fact that the cost of doing business in the electrical industry is 25 per cent, but there are some who think they can operate on 15 per cent. I was glad to hear the previous speaker's remarks on overhead, bringing out the fact that in the jewelery business overhead has been running from 32 to 39 per cent. It will help to impress some members of the trade with the fact that we are not overestimating when we place our figure at 25 per cent.

Now let us consider what the sale price of an article or piece of work consists of: (1) Materials and labor; (2) Overhead; (3) Profit.

We know our labor and material costs. For the purpose of figuring the overhead, let us take a sample business turning over $30,000 in the year. Now it has been proven from statistics and can be backed up that the overhead is not less than 25 per cent., which would in this instance figure out at $7,500. To this add 10 per cent. profit, or $3,000, making a total of $10,500. Subtract this from $30,000, and we are left with $19,500, which should be the cost of material and labor involved in doing a business of $30,000.

How to Figure the Selling Price

Next let us consider how to arrive at the selling price, given our labor and materials costs in the first place. This apple which I draw on the blackboard will represent the selling price. Now we will mark off 25% of the apple as overhead, and 10% for profit, totalling 35%, which leaves 65% for labor and materials. If the labor and materials cost $100, and this $100 represents 65% of the selling price, what is the total of the selling price. Well, we've got to figure it out, as 65 is to 100 so is 100 to 100 x 100 ÷ 65, which equals, approximately $154. Therefore, we have got to add 54 per cent. to the cost of our labor and materials in order to making a profit of 10 per cent.

Now what does overhead include? Here is a list of some of the things you have got to figure into it: Salaries (estimated at 10%), rent, light and power, bookkeeper, taxes, insurance, workmen's compensation, stationery, advertising, telephone, telegraph, etc., association fees, breakage, depreciation, bad accounts, auto expense.

Don't let us fool ourselves on expense of doing business. The lowest overhead in any line of trade is probably in the grocery business, in which they turn their stock from 10 to 12 times a year, and they figure at 18 per cent.

"1923 Means a Profit for Me"

Let's start 1923 right. Babson's motto for the year is "Bite off more than you can chew, and then chew it." For my own part I prefer, "1923 means a profit for me."

Following Mr. Henderson's address, some questions were asked. One member brought up the matter of the fixed price allowed by the manufacturers on electrical appliances. Could the 25% mark-up allowed be considered sufficient?

In reply Mr. Henderson pointed out that the manufacturers would scarcely be justified in allowing a higher margin on appliances to the contractor-dealer when it was obvious that he was not figuring a proper overhead into his wiring prices. Otherwise, it would merely afford opportunity for cutting prices, or on the other hand, the appliance end of the business would be made to carry the contracting.

The suggestion was also made by another member that the wholesalers should help out the association by offering extra price inducements to members as against non-members.

Don't Sell Electric Ranges—Sell Electric "Cooking"

A few pungent arguments by P. H. Fox whose years of Experience are Sufficient Guarantee of their value*

Selling the Electric Range

It should be remembered that a satisfied range user is a good advertiser and will help sell another. A successful salesman must secure the confidence of the prospect before a sale can be made. Arguments and criticisms must be carefully dealt with; avoid injuring the opinion of the prospect. Care should be taken with prospects who have made a decision on a certain make of range, as any attempt to change a decided mind might ruin any prospect of a sale. He must be frank and diplomatic. Opinions, tastes, interests and viewpoints differ, so he must conform (ostensibly at least) to the prospect's ideas and make her think she is right. Have it in mind she is going to buy—one person often agrees in thought and opinion with the one talking to them. The salesman therefore must be confident of the sale. This thought in turn will breed confidence in the prospect's mind.

In reality the salesman is selling cookery, and the more he knows about it the more successful he will be. Bear in mind, the public never buy anything until they have learned everything possible about it.

Factors of a Sale

Two important factors of a sale are the actual demonstration of the range and its immediate delivery. Very often when a range has to be ordered from the manufacturer in a distant city and the purchaser has to wait a considerable time she loses her interest, thinks of something else she wants and wishes to cancel the order.

It is unwise for a salesman to criticise or disparage a competitor's range. All features are legitimate—all have a purpose and the salesman's company may adopt these features some day and make it difficult to overcome the things he has said.

The following features should be remembered by the salesman when selling:—

(1) The progress of electric cooking today.
(2) Practicability of the range.
(3) Advantages of electric cooking.
(4) Description of cooking rate.
(5) Lighting and cooking rate served with one meter.
(6) The economy of adequate wiring for future use of range and other appliances when lighting circuit is being installed.
(7) The advantages to the owner of the building.
(8) The advantages to the housewife.
(9) Advantages of the range in apartments.

The Idea Must be Sold

Electric ranges are sold—not bought. A purchase is never made until the prospect knows just where, when and how the device is going to fit into her life. Women do not know about electric ranges; therefore electric ranges are never bought "literally"; the salesman must sell the idea of electric cooking, not the range; perfect cooking service, not the price; what the range will do for her, not so much what it does for others—service is always with her—price is incidental. Make her imagine herself cooking more delicious, digestible and nourishing food with uniform results, at a minimum of time, work and cost and absolute safety.

Advise the complete utilization of the oven heat, suggest a pan of apples or various kinds of cookies can be placed in the oven after other food has been finished, and cooked with the stored heat. To a lesser degree, similar results can be had with the surface elements. Water may be heated for dishes after current is turned off with the heat remaining in the elements.

Surface elements are not harmed by water boiling over on them; heavy substances like molasses carbonize but can be removed when dry with a light non-metallic brush.

Cooking by electricity is a matter of education. When the inexperienced attain this information their enthusiasm will be passed on to others.

In some appliances criticisms of some sort may be made; not so with electric cookery. Simplicity, cleanliness, general economy, saving of work and food, perfect cooking, the new and better way appeals to the housewife who develops into the highest grade of advertising and does more to promote cookery among her lady friends than any other method. The expressions of a satisfied user should therefore be an advantage when her experience is an actual one, and her lady friends will not fail to be interested.

NOW, IF I BUY THE RANGE, WILL SHE LET ME JOIN THE LION-TAMER'S CLUB?

In selling Range, Customer Must be Given Free Information

Merchandising electric ranges might be said to be in its infancy. Considerable ability and knowledge with regard to all features of operating, installing and proper service are necessary. The contractor-dealer will remember the large percentage of prospects are laymen and know nothing about electric cooking or operating the range or requirements for same, and full information as to operation, use and cost in every detail should be given; also the various ways in which economy can be practised to get full value. In this respect, I refer to stored heat as one important feature and how to take advantage of it.

Many sales are lost because of failure on the part of the salesman to go into full details, with information, thereby allowing the prospect to leave with a doubt in her mind. Each feature should be explained fully—capacity of the element, also the various heats, high, medium and low, how operated and cost per hour of each, also that full heat is only needed until the food has come to the boiling point; then turn down to low heat which will carry on and save cost of operation 75%. This, it will be seen, is very important as low cost is a feature and bills can be reduced very much by care in this way.

It is also important that the contractor-dealer explain to the prospect that the more current used the cheaper it is per kw.h., as it is safe to say not so many people know about it. In discussing cost of operating the range and water heaters, I have found people are at a loss to understand why the cost of operation is so low until they find the cooking rate here in the city and many other places is only one cent per kw.h. less 10% prompt payment. It is suggested the contractor-dealer make it a point to show the prospect how the cost is figured.

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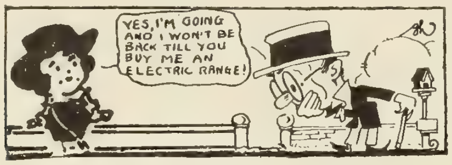
*Before the recent Contractor-Dealers' Convention.

The cost of wiring and installing the range can advantageously be included with the price of the range. This will save the contractor-dealer the difficult task of selling the wiring separately which has been responsible in many cases of losing the sale. It also makes two sales instead of one and overcomes the impression that the cost of installation is high. In this case it will also show the prospect that the range service increases the value of the property, same as adding a sun parlor to the home or a garage.


YES, I'M GOING AND I WON'T BE BACK TILL YOU BUY ME AN ELECTRIC RANGE!

The Greatest Mistake in Range Selling

The greatest mistake in range merchandising today is selling below manufacturer's list price. It is a false policy and deliberately takes the legitimate profit. Moreover ranges have no standardized price and are not a seasonal proposition. Today electric ranges are sold every day of the year.

Every contractor-dealer should use an electric range in his own home, so that he can more fully and intelligently explain its advantages and operations, thereby fitting himself as a better salesman, gaining more confidence with the prospect.

He must know the general construction of the range and service needed and have a general knowledge of how to cook some of the simple popular foods, how to prepare the oven for baking, etc.

The contractor-dealer is just as important in his position as the central station, jobber and manufacturer, and belongs to the industry. He is entitled to live if he specializes in wiring and the retail selling of electric goods at a profit. He does not compete with the central station. He does not sell current and every transaction he makes shows on the profit side of the central station ledger, so he must be protected in the sale of ranges and other appliances.

Mr. Madill Takes over Electrical Department

Mr. F. G. Madill, has recently taken over the management of the electrical, household hardware, sporting goods, paints, kitchenware, silverware, china and cut glass departments of the R. H. Williams & Sons, Ltd., departmental store, of Regina and, since his appointment, the entire basement floor has been re-constructed—new stairway and lighting system, new stock fixtures and ceiling. Mr. Madill previously was engaged with the T. Eaton Co., Ltd., at Toronto, for a period of five years, as assistant manager of the china department, and for Porter & Company, Winnipeg, as one of their representatives in Western Ontario, Manitoba and Saskatchewan for four years; also with A. Rae & Co., Ltd., Ottawa, as buyer in the china, and hardware departments; the Right House, Hamilton, as assistant manager and the Robert Simpson Co., Ltd., Toronto.

Annual Dinner and Rally of Electric Service League of British Columbia

The entire electrical industry of Vancouver was represented at the annual dinner and rally of the Electrical Service League of British Columbia, held at the Hotel Vancouver, Tuesday Evening, November 21st, 1922.

A stunt program was arranged in which a representative of each branch of the electrical industry lauded to the skies the part his particular branch of the industry played in the activities of the Service League and then knocked the activities of some other branch of the industry—this was the signal for interruption on the part of the representative of the branch of the industry being "slated."

The speakers were Mr. Fred Little, manager of the Northern Electric Co. for the jobbers; Mr. W. W. Fraser for the electrical contractors; Mr. John R. Read, manager Canadian Westinghouse Co. for the manufacturers; Mr. Earl Jarvis for the dealers and Mr. Saville of the B. C. Electric Railway Co., Ltd. for the residence wiremen.

Mr. E. E. Walker of the B. C. Electric Ry. Co. as toastmaster tied in the remarks of the various factions with the conclusion that as every branch of the industry seemed satisfied with the efforts of the Service League their cooperative work must go forward with added impetus for the new year.

The financial report was made by Mr. H. Pim, manager of the Canadian General Electric Co., honorary-treasurer of the Service League. Mr. Rey E. Chatfield, secretary-manager of the Service League gave a report on the Electrical Home and Mr. Jas. Lightbody outlined the proposed activities of the League for the new year.

Real Spirit of Friendliness

The outstanding feature of the rally was the real spirit of friendliness and understanding apparent, which no doubt is in a measure due to the League work for the past year.

League Officers

Election of officers and members of the Advisory Council for the League for the fiscal year ending September 30th, 1923, took place at the meeting of the Advisory Council of the League which was held Thursday, November 23rd:

Hon. president—Mr. George Kidd, B. C. Electric Ry. Co.
Hon. vice-pres.—Mr. W. G. Murrin, B. C. Elec. Ry. Co.
Hon. sec.—Mr. Jas. Lightbody, B. C. Electric Ry. Co.
Hon. treas.—Mr. H. Pim, Canadian General Electric Co.
Chairman of the Advisory Council—Mr. E. E. Walker, B. C. Electric Ry. Co.

Advisory Council Members:—Mr. H. Pim, Canadian General Electric Co.; Mr. J. F. Little, Northern Electric Co.; Mr. J. R. Read, Canadian Westinghouse Co.; Mr. Ralph Graham, Mr. Earl Jarvis, Mr. P. F. Letts, Vancouver Association Electrical Contractor-Dealers.

It Costs More To Do Without Electrical Appliances!

When a housewife's time is figured out on a reasonable basis, the following facts are brought to light. Can you figure it out?

"Every woman who does without a washing machine, goes, annually, $22.77 in the hole. Those who do without an electric iron lose $49.40. Doing dishes by hand costs $164.22 a year. Cleaning by broom is a $21.87 household expense. For every year that the buying of an electric range is postponed, it costs the postponer $8.80. Sewing on the old-fashioned machines is a $126.16 extravagance."

Vancouver Stages First "Electric Home"

Activities of Electric Service League Give Definaite Stimulation to Retail Sales

Vancouver's first electrical home closed October 28, 1922, after a very successful exhibition lasting sixteen days. During this time 21,719 visitors passed through the home, or an average of 1,357 visitors daily. The record attendance for one day was 2,111, an average of 234 persons per hour.

To adequately advertise, manage and finance such an exhibition was quite a task for the industry. The chief difficulty to surmount was the question of finance, and this was overcome in a unique way. Through the co-operation of a firm of architects and a firm of plastering contractors the following scheme was worked out.

Financing

The selected building supply houses were approached with the proposition that the plastering contractors were financing the building of a model home, which would be exhibited as an Electrical Home by the Electrical Service League of British Columbia, and that tremendous publicity would accrue to the firms supplying material for the home.

Competitive bids were then called for by the architect for the materials needed and the successful bidders were visited by the secretary-manager of the Electrical Service League and a representative of the firm building the home, who **in every case succeeded in obtaining a material reduction** in the price for the material specified. The difference between the final price and the first competitive price of the successful bidder was paid to the Electrical Service League by the builder of the home—the local plastering contractors—as the nucleus of a publicity fund. In other words, the building supply houses, lumber mills, shingle mills, etc., bought publicity with their merchandise.

Many firms furnished better material than that specified because they saw the value of the publicity. However, the builder only paid the Electrical Service League and the supply house concerned, jointly, the competitive price for material specified.

Fifteen hundred dollars was raised in this way toward financing the advertising campaign.

The Electrical Service League contributed approximately $750.00 to the publicity fund and assumed the responsibility of managing the exhibition. The builder **agreed to pay the net cost** of the wiring installation as specified by the League. This scheme thus earned the interest and support of the entire building trade in the city.

Having thus overcome the chief obstacle, namely—finance, the League was ready to go through with the Home.

Publicity

The publicity campaign started three weeks in advance of the opening of the home, when a large billboard was erected at the intersection of three main driveways, one-half block from the home. This billboard showed a perspective sketch of the home itself, together with an announcement of the location of the home and the date of the opening.

On the site of the home another small billboard was erected giving the names of the co-operating non-electrical firms and the material each supplied.

From the time of erection of these two billboards until the home was completed the workmen were forced to work behind locked doors as people were constantly visiting the home in the hope of seeing it long before the date of the official opening.

The week previous to the opening the large advertisement shown below was run in all three newspapers of the city announcing the opening of the home. After the home opened the second advertisement was run in the newspapers and during the last week the third advertisement was used.

The route for automobiles was clearly worked on all possible roads of approach by signs attached to the trolley poles "To Electrical Home."

Several days prior to the opening date all street cars connecting directly with the line running to the home and cars on that line, carried fender banners:—

TAKE THIS CAR TO
THE ELECTRICAL HOME.
Opon October 11, 1922.
29th and Granville St.

Conductors on the street cars instead of calling the name of the street, announced at the proper corner "Electrical Home."

Some 400 street car advertising cards announcing the opening of the exhibition of the Electrical Home were used in the street cars. This space was donated by the B. C. Electric Railway Co., Ltd. but the League paid for the cards.

Similar window cards and auto banners were furnished all co-operating firms as well as all members of the electrical industry in the city.

The publicity campaign was quite complete and certainly produced results as far as attendance was concerned.

Every person leaving the home was presented with a booklet which contained a description of the electrical features of the home and a list of the co-operating firms.

Handling the Crowds

Having made every effort to assure a large attendance at the home it was necessary to handle the crowd. A House Committee of fourteen was chosen from the leaders in the industry, each of which had charge of the exhibition staff during at least one day while the Home was open.

The chairman of this committee as well as the chairman of the house furnishing committee and wiring committee reported direct to the manager of the Home who was the secretary-manager of the Service League.

The demonstrating staff was made up entirely of volunteer help recruited from the industry.

There were 440 positions to fill and 116 different men were recruited to do the demonstrating and give the talks.

Of this number 49 were contractor-dealers, 23 representatives of electrical manufacturers, 18 jobbers' representatives, 19 from the central station, and 7 from allied interests.

Demonstrator Talks

The week before the home opened 150 copies of suggested talks for each demonstrator were prepared in pamphlet form and mailed to the demonstrators. The demonstrators did not learn these talks word for word but for the most part the talks were very closely followed.

A master sheet was prepared showing the dates and station each man was to fill and each individual demonstrator was notified in writing that on such and such a date he was to fill a certain station during a definite shift. Demonstrators served in two shifts of four and one-half hours each.

The day before the opening of the Home a private exhibition was held for the families of men in the industry. At this private exhibition and on the first shift of the opening day the House Committee men served as demonstrators so that every committee man was enabled to become thoroughly familiar with every detail of demonstrating the home.

Counting the Visitors

Perhaps the most important men on the demonstrating staff were the door man and the despatcher. The door man counted the visitors with a counting machine and saw that groups of from ten to fifteen only entered the home at a time. These groups of visitors went through the home as a group and were passed from room to room.

The talks in each room were so synchronized that when the despatcher pushed the button controlling an electric bell each group was ready to move on to the next room. The route through the home was arranged so that no two lines of traffic crossed; consequently the visitors were able to see every feature in the home without confusion.

On the opening day a reception to the executives of the various Women's Clubs was held and the formal opening of the home was made by the President of the Associated Women's Clubs of Vancouver.

Interesting the Architects

In addition to the two private exhibitions already described a private exhibition was held for members of the Architectural Institute of B. C. No attempt was made to have a full staff on duty for this exhibition but the architects spent several hours in the home and the men on duty merely answered questions.

Special invitations were mailed for all three private showings of the home and admission was by invitation.

Adequate wiring installation was the keynote of every talk, except the talk by the man receiving the visitors upon their entrance to the home. This demonstrator explained the purpose of the home and the manner in which the appliances were chosen.

As a means of creating a desire on the part of the public for better wiring, the exhibition was an unqualified success.

Sales have been Stimulated

Appliance sales have been stimulated and prospective builders are already calling upon the League for assistance in laying out wiring installations.

As a direct result of the home much residence wiring is getting away from the hands of the curbstone contractor and comes to the legitimate contractor-dealer and the convenience outlet idea is sold to many people.

Recently a man phoned the League office to this effect—"Why say, I have your Electrical Home beat seven ways,—you ought to see my new home—You only had 202 outlets in the Electrical Home and I have 342 in mine—You only had 43 convenience outlets in your Electrical Home and I have 65 in mine." His figures were correct and the secretary asked where he got the idea and he answered—"Why—at the Electrical Home of course."

Undoubtedly the Electrical Home has done much to promote appliance and better wiring installation sales, but it also did much to cement together with the various branches of the industry as we had curbstone contractor and legitimate contractor-dealer; jobber salesmen and central station representatives working side by side for a common cause.

Buy Electrical Goods Yourself

It is a particularly good suggestion that everyone employed in the electrical industry should strain a point to make their Christmas purchases entirely of electrical goods. It is urged that employers should point out to their employees that their purchases of electrical devices really increase the ability of employers of electrical labor to provide steady employment, and that it adds to the prosperity of the industry as a whole.

The idea, we believe, is well worth driving home. If we in the electrical industry believe in the value of electrical goods then we should ourselves demonstrate this fact when it comes to making purchases of Christmas presents. If every man in the industry will buy electric goods, the moral effect alone on the total number of sales made this Christmas might be really tremendous. Charity begins at home. Let us not overlook giving our own industry a boost ourselves at the same time that we are urging the public in general to do the same.

Trade Publications

The first annual report of the British Cast Iron Research Association has been received. The object of the Association is to promote co-operation among iron founders with a view to carrying out industrial and scientific investigation relative to the production, treatment, manufacture, and uses of cast Iron. The report describes a large number of researches that have been undertaken. The report is issued from Central Street, Birmingham, England.

"Electricity From the Wind" is the title of a booklet recently issued by the Glasgow Engineering Company, Limited, Pitt Street, Glasgow. The booklet describes various wind engines, towers and dynamo connections. The idea of directly coupling a windmill to a generator is somewhat novel in this country, but the idea would appear to have certain applications of real use.

In order to acquaint the industrial gear user with the advantage of Micarta Gears, the Westinghouse Electric & Manufacturing Company has issued a 20 page booklet, Folder 4506, entitled "Salient Facts on Silent Gears." The booklet describes the advantages of the use of Micarta gears and pinions and gives photographs and data describing some of their applications, tables of gear data, etc., enabling the gear user to judge whether or not they are applicable to his machinery.

Because of the unusual interest and activity of railroads in heavy traction electrification, the Wsetinghouse Electric & Manufacturing Company has reprinted an article on the "Advantages of Railroad Electrification" by Mr. R. J. O'Brien of its Heavy Traction Department that appeared recently in the technical press. The publication is known as reprint No. 128.

Contractors and Dealers of Toronto Hold Meeting for Discussion

Licensing, Co-operative Buying, Relations with Manufacturers and Jobbers subjects of much argument,—Committee appointed

A well-attended meeting of Toronto contractors and dealers was held in the Empress Hotel on December 1, City and suburbs were equally well represented. Mr. E. A. Drury acted as chairman and Mr. J. A. McKay as recording secretary.

The first subject discussed was the matter of licensing. Several speakers explained what this was and alluded to what had been accomplished in other cities. The fact that plumbers require licenses was mentioned. The distinction between city and provincial licensing was pointed out. No objections were raised to licensing, beyond the suggestion that those in the country might not be able to work in the city. A committee was appointed to look into the matter. This committee will deal mainly with the question of city licenses.

Another question brought up was "Co-operative Buying. The opinion was explained by one of the members that this was the best way of meeting present unfavorable conditions in the trade. He stated that jobbers gave no co-operation to contractor-dealers. In some cases their salesmen actually took orders away from the contractor-dealer. At the present time the manufacturer has a cast-iron organization; so has the jobber. Contractor-dealers are not by any means so strongly organized. Were the manufacturers and jobbers in favor of the provincial licensing bill? Recent advances in the tariff on electrical goods coming into Canada would indicate that the manufacturers and jobbers have some political influence. Why then do they not exert this to get a proper licensing bill?

There were all sorts of rumors floating around about price-fixing and so on. "Prices have advanced recently on many wiring items—Co-operative buying will help to eliminate this. Get together, pool a certain amount of money; everybody will come in if we can show how they can get goods cheaper."

A hot discussion followed. Several speakers contributed their experience of what had happened to co-operative buying in other lines of trade. It was pointed out that at the present time the contractor-dealer was up against unfair competition from jobbing houses. Some of the less reputable would sell to anybody at jobbing prices. A great trouble was the fact that general contractors could buy wiring supplies and then have jobs done by day labor. It was not uncommon to find jobbers selling fixtures, reflectors and so on direct to builders.

The discussion then veered around to the question of appliances. The complaint was made that there was not a big enough spread on these. Hardware lines were contrasted with electrical lines. It was pointed out that electrical appliances require intensive selling methods. One speaker said that he believed certain appliance manufacturers would be glad to sell direct to a co-operative buying association.

It was finally decided that the best thing was first to get everybody in line. Then go to the jobbers with the idea of getting them to co-operate. There was no desire to eliminate the jobber. What was wanted was to get him to co-operate to the extent of charging an established retail price to others than the trade. In the opinion of some speakers, this might be accomplished. If this failed they could go on in other ways. At the present time wholesale grocery jobbers were up against it. Examples of successful co-operative buying by drug and hardware stores were given.

It was finally decided to appoint a committee to approach the jobbers on the question of what co-operation could be expected from them.

Turning Stock 10 times per year

Mr. A. C. McCammon, recently leased space to the amount of 225 square feet on the main floor of one of Regina's leading department stores—the Regina Trading Company—for electrical merchandising, carrying Westinghouse ranges, Community washing machines, Northern electric vacuum cleaners, electric fixtures, tungsten lamps, flashlights and appliances of all descriptions—Hotpoint, Canadian Beauty, Superior and Majectic. Mr. McCammon was previously manager of the electrical and hardware departments of the R. H. Williams & Sons, Ltd., Departmental Store, Regina, Sask. He states that since opening here six weeks ago, business has more than realized his expectations. Stock has been turned over 1.2 times since opening.

New "Electric" Block

Contract for the new "electric block" has been let to Mr. Wm. M. Orr. The building plans call for a two storey structure 62 feet in depth. The ground floor will be occupied by the Chilliwack Electric Co., as a store, office and workshop. With the facilities the new premises will afford the Chilliwack Electric Company expect to be able to give the public a thoroughly efficient and prompt service.

If we who are engaged exclusively in the electrical game are to hold and extend the appliance business, we must all face the situation squarely and adopt attractive measures to gain an increased volume of sales.

Radio Amateur Clubs in France

, Owing to governmental restrictions, the development of radio amateur clubs in France has been so retarded that up to date there have been few in existence outside of Paris. The Radio Club of France has recently established its first branch office at Marseille, and its local representative has opened offices at No. 44 Rue des Abeilles and in the grounds of the French National Colonial Exposition. The program of the club provides for lectures, exhibitions, and advice to amateur radio operators and to commercial operators as well, the idea being to foster the development of the radio art.

$750 Worth of Electric Appliances Offered for an Electric Slogan

Contractor-dealers of Winnipeg Stage a Competition That Has The Whole City Interested—Competent Judges Selected To Pass on the Slogans—Contestants Are Given Plenty of Time

Over seven hundred and fifty dollars worth of electric appliances any one of which will be a distinct addition to the home are being offered by the Winnipeg Electrical Contractor Dealers' association as prizes for the "Slogan" contest.

Great interest has been aroused in this competition, and as there are eight prizes these slogans will be judged according to merit, and the prizes given accordingly. The competition will remain open until December 23 and the following are the prizes offered:

1—Westinghouse electric range, installed in home	**$210.00**
2—Community electric washing machine	**144.00**
3—Northern Electric radio set	**125.00**
4—Hot Point electric table set	**90.00**
5—Universal electric vacuum cleaner	**70.00**
6—Moffat electric grate	**48.00**
7—Star electric heater, 1 to 3 k.w., and wiring	**50.00**
8—Electric air heater	**24.00**

Competent judges will be selected to pass on the slogans sent in. The slogan must be expressive of the objects of the association, and these objects are:

1—To further the developments of the electrical industry in Manitoba.

2—To combine safety, convenience and reliability in the application of electricity to homes and commercial institutions.

3—To maintain a high standard of business ideals amongst electrical dealers.

4—To create a high standard of workmanship in electrical installations.

5—To give to the public the benefit of their experience in the latest developments of the electrical industry.

6—To place their guarantee behind all the goods they sell and the work they do.

It is to be noted that anyone can send in as many slogans as they like. They must be sent in an envelope addressed to "Slogan Editor, Contractor Dealers' association, Builders' Exchange, 402 Notre Dame Investment Building, Winnipeg."

The prizes offered are very valuable ones and will be appreciated by anyone fortunate enough to satisfy the judges.

Radio Activities in Saskatchewan Province

Northern Electric Conference brings Radio fans together. Addresses and Demonstrations. Smallest regenerative set. Manager Daly master of Ceremonies.

Under the auspices of the Northern Electric Company of Regina, Sask., through their branch manager, Mr. J. A. Daly, formerly with the company at Toronto and Hamilton, a radio address and demonstration was given before the Engineering Institute, officers of the No. 12 Signal Corps, and radio enthusiasts of Regina and district, on November 27, 1922 by Mr. Hugh Campbell, radio sales engineer of the Northern Electric Co., Montreal.

The address and demonstration created so much interest among those present, that Mr. Campbell received an invitation to address the Rotarions of Regina on the same subject, but owing to previous arrangements in connection with the Northern Electric Co's. radio dealers' conference, it was impossible for him to fulfill the engagement, much to the disappointment of the Rotarions.

The radio sales conference of the Northern Electric Co., sales dealers of Saskatchewan was held in the company's offices in Regina, on November 27 and 28, at which about thirty dealers attended. They were given an address and demonstration by Mr. Hugh Campbell who dealt with the now famous peanut valve, audio and radio frequency receiving sets and loud speakers.

The dealers showed a great deal of interest in the company's two stage radio frequency set, and in the variety of loud speakers which the company have recently put on the market.

A Jolly Banquet, too—

At the conclusion of the conference, a banquet was held in the Kitchener Hotel, presided over by Mr. Daly and, after the banquet, short addresses were given by Mr. Garnett Perry, of the Sun Electric Co., Regina; Mr. Harry Burleson, of the Acme Electric Co., Moose Jaw; Mr. W. Robbins, of Watrous; Mr. A. Townsend, of Milestone, Sask., and several others.

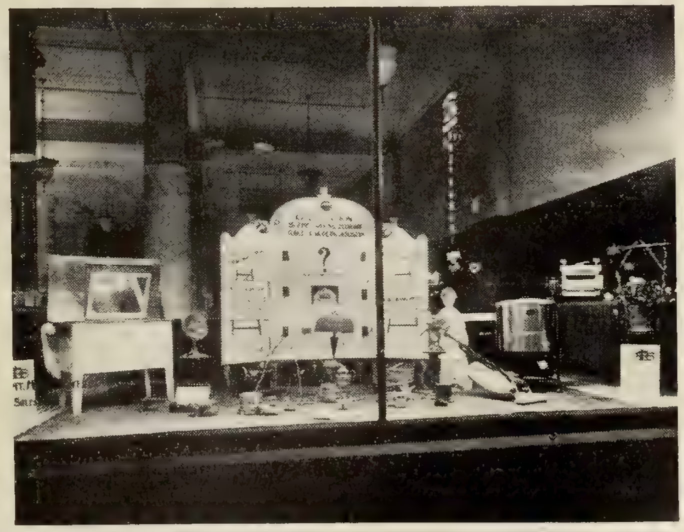
Mr. Daly referred to the interest shown by the dealers throughout the conference, and then remarked how fortunate they were to have Mr. Campbell with them; he felt that the sentiments of everyone present, were, that the address was very instructive.

It was also mentioned that the Regina branch of the Northern Electric Company were carrying large stocks of radio sets and parts, and they had recently received a large shipment of peanut valves, which were in great demand at the present time.

Smallest Regenerative Set

It is worthy of mention that Mr. A. Townsend, proprietor of the Milestone Light & Power Company of Milestone, Sask., and a Northern Electric dealer, who was present, had perfected one of the smallest regenerative radio receiving sets on the market. It consists of a walnut box, measuring 4½ by 5½ square inches, in which is installed the A and B battery, and one Northern Electric peanut valve. This marvelous small set, connected to a Northern Electric loud speaker picked up Los Angeles, 1,200 miles away, Kansas City 954 miles, and Davenport, U. S. A., 900 miles away.

Mr. Townsend has had a wide experience in this line, having been previously on the technical staff of the British, Thompson, Houston Co., of England.



Tieing in the dealer advertising with a general publicity campaign. Window display by the Light, Heat & Power Co., during the recent demonstration of a properly equipped Electric Home in the city of Montreal, P.Q.

Antennas and Their Relation to Radio Reception on Short Waves

Extracts From an Interesting Address Before the Recent Toronto Radio Convention by Dr. C. A. Culver, Chief Radio Engineer Canadian Independent Telephone Company

It may be set down as axiomatic that a vertical antenna is, other things being equal, the most efficient type of receiving system. Experience, both theoretical and practical, of radio investigators covering a period of many years, bears out this statement. There are, however, obvious practical reasons why a vertical antenna is not used for ordinary private reception. We are all also probably familiar with the fact that the next best aerial receiving system is the horizontal antenna, composed of one or more wires. The practical question arises in this connection concerning the most suitable form of such an antenna, having in mind both the strength of signals and the atmospheric disturbances.

Speaking generally it may be said that for the wavelengths used in broadcasting, a horizontal antenna consisting of two wires spaced not less than 5 feet apart and having a length of 100 to 150 feet with a height of the order of 35 feet will give very satisfactory results. Shorter antennas are, of course, in wide use with correspondingly lesser interception of energy. One factor should be borne in mind in this connection, namely, that the natural period of the antenna, should, in general be less than the wavelength which it is desired to receive. For receiving 360 to 400 meter waves, an antenna having a natural period of the order of 200 to 250 meters is a very satisfactory arrangement. Many people have the erroneous impression that several wires spaced quite closely together will intercept more energy than say two wires spaced as indicated above. The object in a multiplicity of wires is to add capacity to the antenna, and it is not generally realized that several wires spaced closely together, say of the order of 1 foot do not have very much greater capacity than two wires spaced five or six feet apart.

Buried Antenna Satisfactory

It is a fact that an antenna system buried in the ground will functionate quite satisfactorily, but in arranging such a subterranean system, it should be made very much longer than one placed above the earth, in order to abstract an equal amount of energy from the advancing wave front. The writer has received Trans-Atlantic telegraphic signals on a single wire several hundred feet in length, enclosed in a lead sheath and buried in the earth. The ratio of signal strength to X's is somewhat better than on one of the aerial type. Such subterranean antennas are very directive, and if used, the free end should be insulated at a point in a direction opposite to the station from which reception is to be had. In using the longer subterranean systems for short wavelength work, it is possible to receive the wave at a harmonic of the antenna system. Indeed such a procedure is possible when using unusually long aerial antenna systems. In fact it may be stated, as a general principle, that, as indicated above, a natural period antenna system should be less than the wavelength one uses to receive or several times the wavelength.

Parenthetically, one may remark at this point, that a tuned antenna system may be excited by a wavelength of double the value for which it is tuned. In fact, in such a case, we have what might be called a sub-harmonic or lower partial. The speaker has, at different times, been advised by radio experimenters that a station was radiating a strong first harmonic, when as a matter of fact repeated careful investigation by means of a wavemeter, disclosed the fact that no first or second harmonics existed. What was probably happening at the receiving station was that the antenna system was tuned to a wave of the order of 200 meters, and was being excited by a wavelength of approximately twice that value.

Interference From Broadcasting and Other Stations

Indeed the whole question of interference from broadcasting and other stations may properly be touched upon at this point. Not long since the speaker had occasion to be testing some commercial receiving apparatus when a local newspaper station was operating. We investigated to determine whether it is possible to tune out a local broadcasting station operating on 400 meters sufficiently to be able to receive the 360 meter broadcast. As a matter of fact, we found while leaving our secondary circuit tuned to 360 meters and manipulating only the primary condenser of the loosely coupled set, it was possible to completely shut out this station on 400 meters, and receive any or all of the American stations. I have recently had one of our engineers determine whether the 400 meter wave of CFCA interferes seriously with the 600 meter commercial wave. Our findings are to the effect that when using modern receiving equipment, there is no serious interference of this character.

It is true, of course, that when using single circuit tuners or certain receivers having a broadly tuned standby circuit, that interference probably will occur between both the 360 and the 400 meter wave, and the 600 meter commercial wave. However, when using an inductively coupled receiving system, there is no appreciable interference between the waves mentioned. This is shown by an audibility curve taken on a standard receiving set. In setting up this curve of audibility on the detector it was plotted against wavelength. An examination of the curve disclosed the fact that 360 meters station CFCA has an audibility of 2.5, at 400 meters, (its working wavelength) it has an audibility of 200 meters, at 475 meters it has an audibility of 7½, at 500 meters it has an audibility of approximately 1. These quantitative measurements clearly show that when properly designed receiving equipment is used, no interference need to be experienced from CFCA when working on commercial wavelengths. The writer would be glad to arrange to have any commercial company which is now experiencing interference from CFCA or CKCE supplied, without charge, with a receiving set, in order that they may be free from the alleged interference.

The Resonance Wave Coil

Continuing now our discussion of receiving antenna systems, it is desired to call attention to the so-called resonance wave coil brougt out by the officers of the American Army Signal Corps.

The theory of the resonant wave coil has been thoroughly discussed from an analytical point of view by Flemming and others. It has been well known for many years that standard waves may be set up on a closely wound helix.

These standard waves manifesting loops and nodes of potential, if we make the inductance and distributed capacity of such a coil of the proper value, so that its fundamental period will be the frequency which we desire to receive, we will have a potential loop at one end of the coil and a loop at the other end: This point of maximum potential may be connected to the grid of an audion, (which, of course, is the potential device), and signals may be received thereby. Major Mauborgne and Captain Hill of the American Army have done considerable work with such an electrical organization. Our Mr. Logwood has developed a receiving circuit particularly adapted for use in connection with the wave coil. Such a circuit in conjunction with a resonant coil has been in use for some time by a local newspaper on its portable receiving station. In efficiency the wave coil is comparable with a loop and for certain uses possesses the advantage that when in a vertical position, it is non-directional.

How to Avoid Radio Interference

In order to assist radio broadcasting there are two wave lengths on which broadcasting may be conducted. These wave lengths are 360 meters, the one in general use up to this time, and 400 meters, just recently alloted. While these wave lengths are 40 meters apart, undoubtedly there will be considerable confusion on the part of those owning radio receivers who are located very near a broadcasting station.

For the purpose of assisting those who are located so that a 360-meter and a 400-meter station are picked up by their receivers simultaneously, number of methods will be described, which, if applied, should greatly assist those desiring to get either one of the two waves without interference. There is one case, however, which will be very difficult to assist; that is, where the receiver is exceptionally near to a broadcasting station—say within a few thousand yards.

Tuning More Sharply

The assignment of two wave lengths so close together will have the effect of stimulating construction of radio apparatus which will be capable of tuning more sharply, and it is the case of "necessity being the mother of invention." Therefore while there may be some inconvenience at the time, this should be overlooked in order to help the radio game by creating a condition which will stimulate the construction of better apparatus, and which will permit the assignment of more wave lengths, ultimately creating a better situation in the other.

One of the greatest faults that has been found in connection with the installation of radio receiving apparatus is that it is believed that the more wire and the larger the antenna, the more will be received. An exceptionally large antenna makes it more difficult to tune sharply, and for this reason it is advocated that a very short single wire antenna, approximately 75 feet long measuring from the apparatus to the far end, be used. This single wire antenna should be stretched away from all metallic objects and run straight and clear of all obstructions.

Another fault in the installation if receiving apparatus can be eliminated by not running the antenna or lead-in over metal roofs, along water spouts or drains, or parallel to telephone and power wires.

Value of Short, Low Antenna

Frank Conrad, assistant chief engineer of the Westinghouse Electric & Manufacturing Company, has made measurements and drawn resonance curves which show that a short low antenna tunes more sharply than large and long antenna. This holds true both for coupled and single circuit tuners.

Another method to pursue in overcoming interference, especially where vacuum tube receivers are used and where the receiver is located close to a broadcasting station, is to make use of the well-known directional properties of the loop antenna. A very simple loop can be constructed by winding a half dozen turns of wire spaced about one inch apart, on a framework, which can be rotated. It will then be easy to tune aut a station which has a difference of 40 meters in wave length, especially so as a loop antenna forms a closed circuit which can be more smartly tuner than an open atenna. The two ends of the loop should be connected across the antenna, the ground terminals of the receiver, and no other ground or antenna used.

Where Amateur Has Transmitting Apparatus

Those who are located a greater distance from a broadcasting station can, without any difficulty, tune in either one of the wave lengths mentioned. They should, however, bear in mind that a single wire antenna, not too long, and kept free from obstructions, and not running near grounded metallic objects, will tune sharper. Where the amateur has a transmitting apparatus it is of course desirable to have a fairly large antenna, with more than one wire, and if such is the case he should use a separate wire for receiving.

The ideal condition will be when stations can operate independently on either of two wave lengths without interfering with each other, and because the receiving apparatus is an important factor these suggestions are given in order that owners of receiving apparatus may have the necessary information to increase the efficiency of their apparatus.

Lincoln Meter Company to be Found in Future at 72 Stafford Street

On November 20th. the Lincoln Meter Company moved from 243 College Street to 72 Stafford Street, Toronto, Ontario. This company has been at the old address for four years.

At this address the Lincoln demand meter was first put into quantity production, due to the satisfactory results obtained from one hundred meters which had been built up two years previously and tested out under all sorts of conditions.

It was here that the Lincoln graphic meter was developed. The Lincoln split core transformer and demand ammeter were also worked out here, and the V. A. D. transformer which made the measurement of volt ampere economically possible; lastly, the Lincoln-Sangamo unit.

"We look back with no little sentiment to that place" says Mr. S. L. B. Lines, vice-president of the concern. "We feel as though that building saw a very considerable advance in rate making. We are proud there is such a place in Canada."

At the new address the Lincoln Meter Company Limited, will have considerably more space. Acceptance and recognition of the Lincoln principle has called for increased production facilities.

Electrification Postponed

The directors of the T. & N. O. Railway System, with the approval of Premier Drury, have decided against the immediate electrification of their railway. The estimated expenditure was in the neighborhood of 11,000,000 dollars and while the advantages were evident, it was considered that the revenue would not at present justify so great an expenditure. The Ontario Government has decided to build the remaining 100 mills of railroad to connect with a port on James Bay.

Have Established Toronto Office

The Canadian Fitzgerald Manufacturing Company, manufacturers of Star-rite electrical appliances announce that they have now established a sales and service branch at 95 King Street East, Toronto. The various appliances manufactured by this company include vibrators, violet-ray sets, toasters, reflectors, heaters, fans, heating pads, sewing machines and general utility motor and waffle irons. The office is in charge of Mr. J. A. Simmons.

Receptacles Without Rubber Rings

The Duncan Electrical Company, Ltd., of Montreal, have now ready for delivery two new receptacles, number 60020 and 50717. These are manufactured without rubber rings, being specially designed for use with nitrogen lamps, where the absence of rings to melt or break will be realized as an important consideration. These receptacles accommodate all shade holders and are 660 watt capacity, 250 volt.

Nice Order From Australia

The Canadian Independent Telephone Company recently received an order for 8,000 telephones from the government of Australia. Two shipments of this order have already been made. This is another evidence that Canadian manufactured products in the electrical field are well able to compete with those manufactured in other parts of the world.

An Attractive Folder

The Wagner Electric Corporation, St. Louis Mo., are distributing an attractive folder entitled "40 degree Motors and 'Blueblood' Transformers." The illustration shows transformers in a great variety of sizes, and explains that the high tension winding is tested for 10,000 volts and the low voltage windings for 5,000 volts. Transformers built for higher voltage are given correspondingly more severe tests.

Square D in Larger Offices

The Square D Company, manufacturers of electrical safety devices, whose Toronto office up to the present has been at 508 Lumsden Building, are moving to offices at 104 Richmond Street West, Toronto. The increasing volume of business in this district, which is in charge of Mr. C. H. Kneeling as district sales manager, has necessitated larger quarters.

The Wright Electrical Co.

The Wright Electrical Co. Ltd., 1715 St. James Street, Montreal, commenced manufacturing marine electric fittings, floor boxes, switch plates and canopies in November. The company is chartered for $20,000. Mr. P.M. Wright of The Northern Electric Co. Ltd., in the marine dept, is manager of the company.

Pole Yard at Charney

J. J. Seguin, telephone engineer, Quebec, advises that he is opening up a distribution pole yard at Charney, P. Q., in order to be able to give quick delivery of poles. Charney is located only a few miles out from the city of Quebec on the south shore of the St. Lawrence and is a divisional railway point where eight railroad lines converge.

"Cope" Bending Tool

T. J. Cope, Philadelphia, Pa., is placing on the Canadian market a tool for bending and forming cable in manholes, vaults or other cable installations. The tool will bend all sizes of cable from 500,000 c.m. to 2,000,000 c.m. and weighs only 12 lbs.

Rubber Insulated Wire

The Standard Underground Cable Co., of Canada, Ltd., are distributing a booklet describing their rubber insulated wire. The booklet is nicely illustrated and contains much interesting information.

"Red Devil" Tools

Smith and Hemenway Co., Inc., Irvington, N. J., are distributing an illustrated pamphlet entitled "Red Devil Automobile and Electrical Tools."

New Retail Store

Mr. Wallace S. Chugg, who has been in the electrical contracting business for some time, has just opened a store at 761 Bank Street, Ottawa, Ont., for the retailing of electrical fixtures, lamps and other equipment.

Isolated Plants in the West

As indicating the extent to which small lighting plants are being installed in Western Canada, we have information from the Canadian Fairbanks-Morse Company, Ltd., that the following sales have recently been made from their Saskatoon office. The engines in every case are their type "Y" Semi-Diesel.

Watrous:—One 100 h.p. engine direct connected to a 75 kv.a. 2,300 volt a.c. alternator, including switchboard and necessary instruments.

Craik:—one 25 h.p. engine belted to a 20 kv.a. 2,300 volt a.c. alternator, including switchboard and necessary instruments.

Bruno:—one 15 h.p. engine direct connected to a 9 kw. 110 volt a.c. generator; and one 10 h.p. engine direct connected to a 6 kw. generator including necessary switchboard.

Duck Lake:—one 15 h.p. engine belted to a 10 kw. d.c. generator with switchboard.

Lestock:—one 15 h.p. engine, belted to a 10 kw. d.c. generator and switchboard.

Young:—one 25 h.p. engine to replace the steam engine that was used last year.

French Railway Contract

An order covering the complete control equipment for 120 electric locomotives, now under construction, has been received by the Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., from the Paris-Orleans Railway of France as part of an electrification contract amounting to approximately $8,000,000,00. The Paris-Orleans Railway, which is one of the largest systems in France operating over 5,000 route miles of track, is electrifying 125 miles of its main line between Paris and Vierzon. This is the first of an extensive program laid out for the electrification of its lines.

A. A. Dobson Opens Store

A. A. Dobson of Cannington, Ont., who was once owner of the electric light plant of this town, before hydro came upon the scene, and who is well known as an all round electrical man, with many years experience as an electrical contractor, has recently opened a store dealing in electrical fixtures.

Ward Leonard Electric Co.

The Ward Leonard Electric Company announce the appointment of Mr. Willis D. Bishop, of Montreal, Quebec, as selling representative in the Province of Quebec. He has been closely identified with the design, application and sale of control apparatus and switchboards since 1904, and is therefore qualified to represent this line of electrical control apparatus.

W. D'Arcy Ryan a Nova Scotian

W. D'Arcy Ryan, of the General Electric Company, of Schenectady, New York, accompanied by Mrs. Ryan and their two children, was in Halifax recently, enroute to Kentville, on a visit to his father, Major Ryan of that town. Mr. Ryan received his early education at Wolfville and Halifax.

S. Wilkins Leaves Winnipeg Electric Railway Co.

Mr. Wilkins, who for some time has had charge of the track construction and rehabilitation work, as well as the construction and maintenance of all buildings of the Winnipeg Electric Railway Company, has resigned his position. The members of the track department presented him with a travelling bag, and a gold wrist watch for Mrs. Wilkins. while the department heads of the company together with Mr. A. W. McLimont presented him with a white gold watch. Mr. Wilkins will make his future home at Vancouver. No successor has yet been appointed.

Radio Insurance

Radio insurance is now being offered by various insurance companies. Blanket floater, radiophone policies against fire, lightning, burglary, theft and transportation accidents may be bought.

Trade Publications

The American Engineering Company of Philadelphia, represented in Canada by the Taylor Stoker Company Ltd., Montreal and Toronto, have issued a beautifully illustrated book containing pictures and descriptions of central station plants using Taylor Stokers. The illustrations include many of the largest steam plants on this continent, among them being the Montreal Light Heat and Power Co., and the Dominion Power and Transmission Company.

Ideas on the maintenance of equipment and proper application of transportation methods, are offered in two attractive publications issued by the Westinghouse Electric & Manufacturing Company. The first book—Electric Railway Equipment—Helpful Hints on its maintenance,—S.P. 1656, contains 112 pages. It gives the electric railway operator or the man directly in charge of maintenance a ready reference on maintenance practice. The second book, S.P. 1655, is a 20 page publication entitled "Electric Railway Transportation." The Light Weight Double Truck Car, the Safety Car and the Trolley Bus are the three leading topics discussed with pictures portraying the actual operation and installation of each type.

"Wave Transmission" is the title of a booklet recently received from Walter Haddon, 132 Salisbury Square, Fleet St., London, E. C. 4. It describes what is claimed as a new method of transmitting power. A description given in the booklet reads as follows—

"Taking the simplest form of Wave Transmission, imagine two cylinders fitted with plungers, the cylinders on the underside of the plungers being connected together by a long pipe completely filled with water. If one of the plungers is moved rapidly up and down it will set up at each downward stroke waves of compressed water, which. travelling along the pipe at the speed of sound (about 4,800 feet per second) will exert their energy on the plunger at the far end, and if this be loaded, a simple reciprocating motion will be produced in exact synchronism with the reciprocations of the first plunger."

The booklet describes various industrial applications that have used this principle. Rock drilling is featured, photos of such an installation being printed in the booklet.

"Far East" transmission lines are up-to-date, judging from the accompanying photograph of the Tone River Crossing suspension towers, Inawashiro H.E.P.Co., China. The photograph was sent us by Mr. E. V. Paniell of the British Aluminium Co.

The Rheostatic Type of Voltage Regulator

The rheostatic type of a.c. generator voltage regulator differs fundamentally from the vibrating type often called the "Tirrill" regulator, in that the new regulator maintains a constant a.c. voltage by means of the generator field rheostat, keeping the excitation voltage at a constant value, whereas in the vibrating regulator, the exciter voltage is varied in order to give the proper excitation current to the generator for a given load condition.

When a station is on hand operation, the field rheostat of the generator is usually manipulated to keep a constant alternating current voltage, while the exciter voltage is maintained at a constant value, or a storage battery may be used either directly—which is rare—or floating across the exciter busses as an emergency reserve source for that station.

This type of regulator supplements the vibrating type of regulator for such applications as are not best adapted to the use of the vibrating regulator. The rheostatic type of regulator is particularly applicable to installations where the time constant (or rate of response to change in voltage on the field of a generator) is slow, where exciters are of large capacity and slow speed, thus having heavy field currents beyond the capacity of the vibrating regulator contacts, or for synchronous condenser applications, where the excitation voltage across the field of the condenser must be lowered to a value below the residual voltage of the exciter, as is very often the case.

The rheostatic type of generator voltage regulator consists of 3 portions:

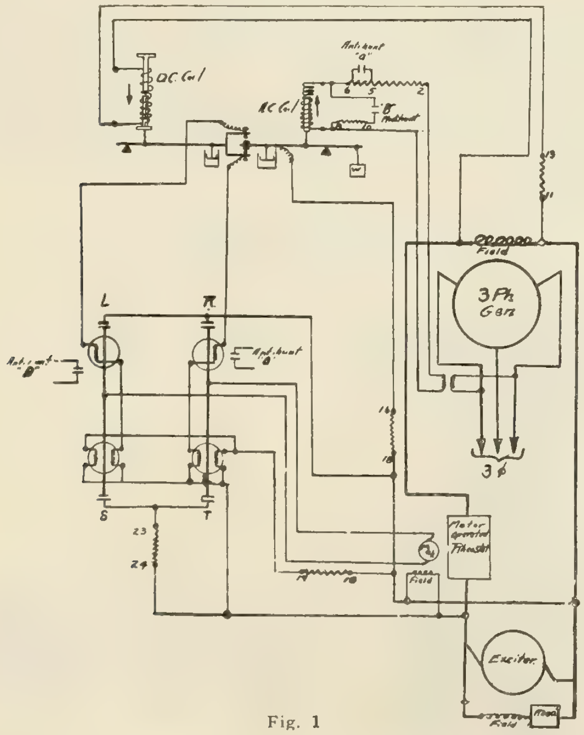


Fig. 1

(1) A control element.

(2) A pair of reversing contactor switches actuated from the main contacts of the control element. The reversing switches are for operating the rheostat motors in one direction or the other.

(3) A special generator field rheostat operating at a high rate of speed.

The control element consists essentially of a set of contacts jointly actuated by an alternating current and a direct current coil. These contacts control the direction of rotation of the rheostat motor through two reversing contactor switches. The a.c. coil is connected to the generator lead through the use of a suitable potential transformer. The d.c. coil is connected across the terminals of the generator field.

The regulator is either put in or out of service by means of a single drum control switch. When it is desired to place in service or remove the regulator from service, the turning of this one switch places the machine either on hand control or under the control of the regulator.

Fig. 1 shows a simplified diagram of this regulator.

The regulator operator as follows: Assume that a slight over-voltage exists on the generator due to a sudden drop of a portion of the load. This will cause the control levers to become out of balance, and close the upper contacts. This closure energizes the upper coil and de-energizes the lower coil of the reversing switch marked "LS" causing contact "S" to open, and contacts "L" and "b" to close. Contact "L" closes the circuit through the motor armature which in turn, starts cutting in resistance of the generator rheostat into the field circuit. At the same moment, contact "b" shunts a small amount of current from the alternating current coil on the control element, and in effect, recalibrates it for a slightly higher voltage. This causes the core to drop opening the main contact which in turn de-energizes the coil in the upper and lower portion of the reversing switch "LS" and this switch consequently opens its main contact "L" and auxiliary contact "b" and closes the lower main contact "S". Since contact "T" of the other reversing switch is in the closed position, the armature of the motor is now short circuited, causing it to stop quickly by the dynamic braking. This causes an intermittent movement of the rheostat arm generally known as "inching," and effectively prevents hunting when the alternating current voltage is very nearly correct. In a like manner, if the a.c. voltage is too low, the main control element closes its lower contacts due to the core dropping in the a.c. coil and actuates the reversing switch "RT" closing contacts "R" and "A" which in turn, reverse the direction of rotation of the rheostat arm, increasing the excitation and bringing the voltage back to normal. Due to an anti-hunting contact "a" which in this case cuts out a portion of the series resister of the main a.c. coil of the control element, the "inching" process is also obtained.

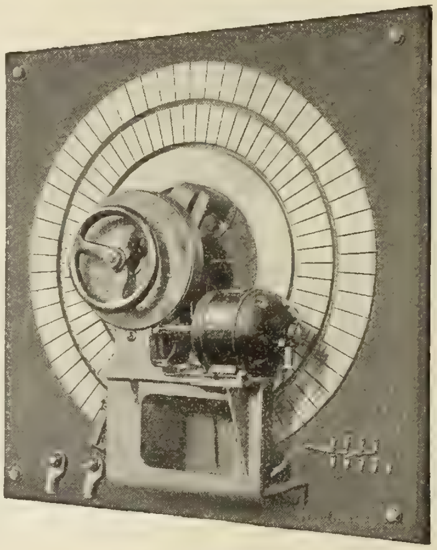


Fig. 2

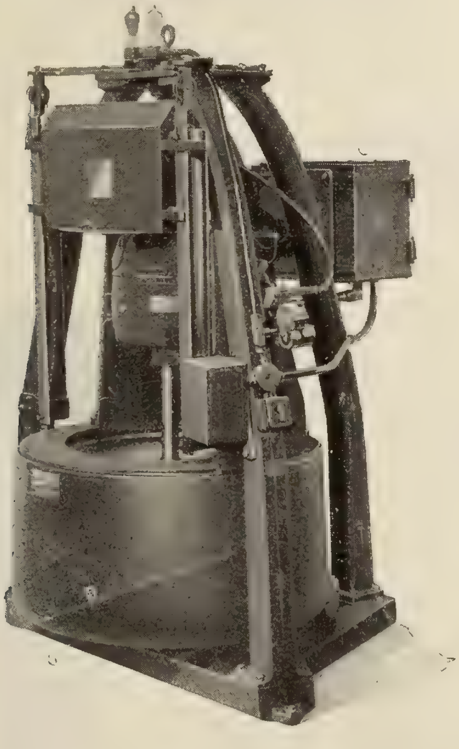
The Latest Developments in Electrical Equipment

Thumb Switch Portable Lamp Guard

The McGill Manufacturing Company, Valparaiso, Ind., are marketing a new lamp guard of novel construction. The guard carries a convenient thumb switch, so that it may be carried about and operated with one hand. It is claimed by the manufacturers to be particularly adapted for use in garages and the basements of private homes. A 25 to 40 watt lamp may be used.

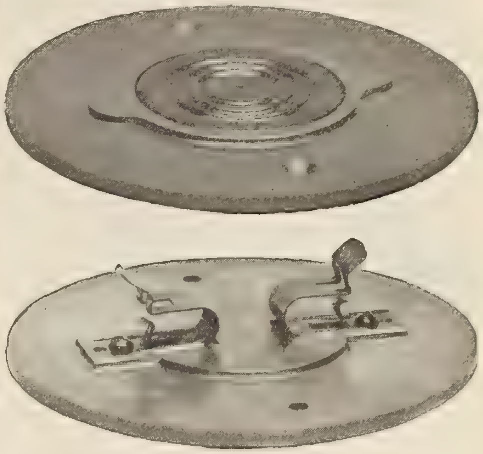
Automatic Extractor

The American Laundry Machinery Company, Cincinnati, Ohio, are manufacturing a clothes extractor for commercial laundries, which has several interesting features. A development which they mention particularly is the timing device by means of which it is possible to pre-determine the time of extracting. Another device is the safety cover which is raised automatically as soon as the basket has ceased revolving and which cannot be raised while the basket is in motion. It is claimed by the manufacturers that the timing device saves much time and labor by making it possible for the extractor man to set his machine for 5, 10 or 15 minutes and then work at some other duty. At the end of that time the machine will stop and the safety cover raised automatically, thus signifying to him that it is time to come back and unload.



Derby Fire Signal

The American Fire Prevention Bureau, Inc., 1 Madison Ave., New York, N. Y., are marketing the Derby Fire Signal, a device designed to give early warning of fire. It it claimed to be very simple in construction, having no moving parts, requires no adjustment and not subject to derangement or false alarms. It is composed of such materials as phosphor bronze, bakelite dilecto, varnished cambric and standard automatic sprinkler solder. The terminals are Fahnestock clips. It is claimed to be sensitive, owing to the form in which the solder is made and the heat conductivity of the bronze case. In a standard sprinkler test oven it is said to operate in one-fourth the time required to open an approved automatic sprinkler. The sentinel gives visual indication when it has operated, in the form of a small bulb of solder which appears in the centre of the thermostat. These thermostats are preferably wired on a closed circuit system, each floor being a unit. Any derangement of the circuit will give a local or central station trouble alarm. Upon the operation of a thermostat, resistance is automatically cut out of the circuit, thereby causing the operation of fire gongs and transmitters. It is made for attaching to open wiring and also for use in connection with concealed work.



Compartment Battery Box

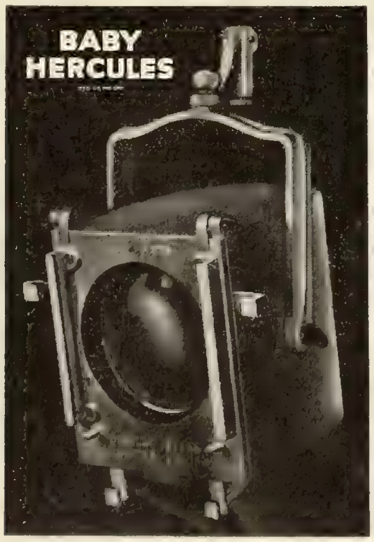
The Rub-Tex Products, Inc., Indianapolis, Ind., are marketing a new type of battery box for "A" batteries. The device is shown in the accompanying illustration. It is made in three sizes for 6-volt batteries of 7, 9 and 11 volt capacity. It is made conveniently portable by means of a loaded bail handle with rubber grip. This box is claimed to eliminate any trouble from leaky storage batteries and consequent worry to the radio fan.

Electric Clothes Dryer

The Canton Clothes Dryer Co., Canton Ohio, are manufacturing an electric heated clothes drying machine. This device is so constructed that the heating and ventilating units generate ozone, valuable for its bleaching and sterilizing qualities. It is claimed that it is the only clothes dryer made with heater entirely enclosed within a radiator, and that any danger of shock to the user is entirely eliminated. Connections can be made to any outlet or socket as no special wiring is required. In addition to the heating element for the dryer, the manufacturers furnish one baseboard or wall recptacle, together with an extension cord of two strands of number 10 wire, each strand six feet long, with plug at either end. The extension cord can be disconnected at either the dryer or baseboard as the user may choose.

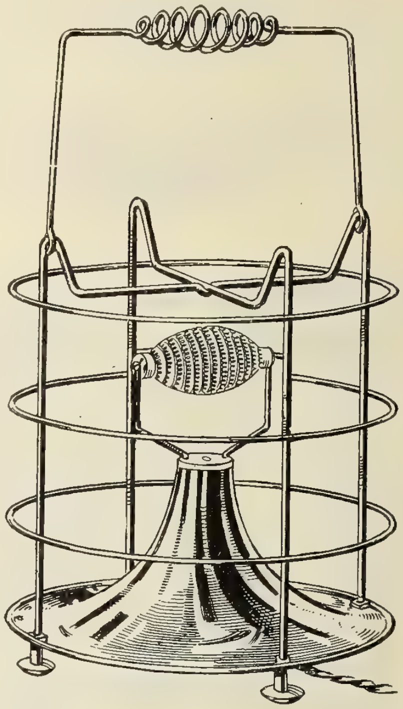
Spotlight for Window Lighting

To meet demands for window lighting of a flexible nature the Display Stage Lighting Company, Inc. of 314 West 44th Street, New York City have put in new form their Baby Hercules spotlight. It enables concentration or flooding of light of any color on merchandise. The housing is entirely of cast aluminum well ventilated around lens, sides and back, and fitted with a spherical reflector, French condensing lens and color screens. The lamp used is a 250 watt G-30 Mazda concentrated filament which unhoused has 431 horizontal candle-power, while in this equipment the beam candle-power is 2,000, from tests by the Electrical Testing Laboratories of New York City.



Reflecting Electric Radiator

The Electric Heating & Mfg. Co., Seattle, U. S. A., are putting on the market a new type of electric radiator. This product is known as the Circo-Flector, and it is claimed to throw the heat in all directions with no concentration in any one spot. The device is operated from a lamp socket (660 watts) and is 15 ins. high. It is said to be capable of doing small cooking operations on the top. It is furnished in a mailing carton, with 10 feet of asbestos cord and a two-piece separable plug.



Electric Grinder

An 8 in. electric grinder with a motor of ½ h.p. capacity is being placed on the market by the Black & Decker Manufacturing Company, Towson Heights, Baltimore, Md. In order that the device may be used in places where either direct or alternating current is available, motors of a c. or d.c. type are provided as required. The grinder wheels have a diameter of 8 in. and a ¾ in. face. A toggle switch located in the base of the machine controls the operation of the motor. The speed of the motor and grinding wheels is 3,600 r.p.m. and without pedestal the net weight of the machine is 75 lbs.

Current News and Notes

Bolton, Ont.

Mr. W, H. Maw, a well-known electrical contractor and hydro superintendent of Bolton, Ont., has recently opened a very nice store, dealing in electric fixtures and appliances. This store is very attractive, consisting of two windows, one on either side of entrance to show room, a stock room in rear and an office situated at one side of the show room. This store when lighted by night, is very attractive indeed for a town of this size. The new store is known as the Bolton Electrical Supply Store.

Gore Bay, Ont.

Mr. Hutchinson, Government Hydro engineer, recently made an inspection of the Kagawong Falls with a view to estimating the power that may be available for supplying light and motor power for industries on Manitoulin Island and vicinity.

Kitchener, Ont.

The management of the Waterloo--Wellington Railway has applied to the city for a 25 year franchise. The question has been turned over to the Railway committee of the City Council, which will have a conference with the Light Commission.

Kingston, Ont.

The fire which broke out recently destroyed the feed mill and electric light plant at Tamworth, Ont., owned by Mr. A. B. Carscallen, doing damage at $12,000. As a result of the fire the town of Tamworth will be without lights till the plant can be rebuilt.

London, Ont.

The defeat recently of the by-law authorizing the taking over the London Street Railway does not mean that the idea of a municipal railway will not ultimately be adopted here. The possible expense of lengthy arbitration, the meagre details of the by-law given to the people, and the fact that the company's franchise does not expire till 1925, all worked against the by-law. It is possible that the road may be purchased within the year by agreement.

Mimico, Ont.

As a result of a fire, which broke out recently, the temporary building, housing the York sub-station of the Hydro-electric on Church Street, was completely destroyed and some of the machinery was badly damaged. The transformers were only slightly damaged.

Moose Jaw, Sask.

The Livingston Electric Company, electrical engineers and contractors, Moose Jaw, Sask., have recently moved from 161 High Street West, to much more commodious premises, at 16 fairfoot Street, West, Moose Jaw, where they will be able to carry a much larger stock of electrical goods on display.

The Electric Shop, Mr. J. Ecclestone, proprietor, wiring contractors and general supplies, was recently opened to carry on contracting and will also stock a full supply of electrical merchandise.

The Moose Jaw Gas and Electric Company have ceased to do business.

Ottawa, Ont.

The Ottawa Electric Railway Company has recently offered to sell out to the city its entire system, with all property and assets, including water lots, for $4,500,000, or is willing to accept a price fixed by arbitration.

Quebec, P. Q.

First reading was given in the Legislature Assembly an November 16 to the bill amending the charter of the Montreal Public Service Corporation, and changing its name to that of "The Quebec New England Hydro-electric Corporation."

Toronto, Ont.

Approval by order-in-council was recently given for the sale of the Toronto Suburban Railway to the Hyrdo-electric Power Commission of Ontario. The terms and conditions of the transfer are left to the management of the road.

Gross earnings of the Northern Canada Power Co., for the first nine months of the year stand at $538,959 as against $370,453 a year ago; net earnings $479,900 against $312,679, an increase of approximately 63.5%.

Mr. P. W. Ellis, chairman of the local Hydro-electric Power Commission, recently stated that the commission was of the opinion that a conservative estimate of the increase in power consumption in Toronto alone was 10 per cent. per annum. On this basis, in 1929 the Toronto Hydro would require 235,000 horsepower for sale to users, exclusive of the power required to operate the street railway. In view of this the commission considered there was immediate need of laying plans for increased generating capacity at Chippawa.

The Patterson Electric Co., electrical contractors, have moved their offices to the Northern Life Bldg., 615 Yonge St.

Windsor, Ont.

Mr. James E. Banwell has been re-elected Hydro commissioner over Mr. A. Moore.

J. S. Torry, a Toronto electrical contractor, has recently opened a store at 407 Roncesvalles Ave., Toronto, and is dealing in Electrical Fixtures and appliances and is doing contracting as well.

Wiring Contracts Awarded

Aylmer East, Que.

F. Woolsey, Aylmer East, $4,000 res., St. Thomas & Court Sts.

Cap De La Madeleine, Que.

P. E. Lacroix, Point St. Maurice, $5,000 res., Notre Dame Street.

Chambly, Que.

C. E. McGregor, 55 Mercille St., St. Lambert, $12,000 clubhouse, Bourgogne St.

Dorval, Que.

E. Miller, 141 Notre Dame Street, Lachine, $18,000 res.

Lachine, Que.

Phillip Lahee & Co., 20 St. Nicholas St., $300,000 school.

Verdun, Que.

E. Robillard, 225 Hamilton St., $75,000 flats, Lasalle Rd.

Westmount, Que.

S. M. B. Electric Co., 485 Beaumont St., $25,000 pr. semi-detached res., The Blvd.

Windsor, Ont.

Chas. Usher, 9 Aylmer Ave., $4,500 res., Pelissier St.

Levis, Que.

Nap. Lepage, Bienville, Que., $18,000 hotel, Commercial St.

Hamilton, Ont.

Jim. Donaldson, 184 Charlton St. W., $12,000 factory.

Maxville, Ont.

R. J. Desjardin, residence, Mechanic St.

Mimico, Ont.

H. J. G. Ferguson, 69 Boon Ave., Toronto, $30,000 church.

Montmagny, Que.

La Cie Electrique De Montmagny, $200,000 altering church, contract price $2,000.

Montreal, Que.

R. Chamberlain, 16 Garnier St., three flats, Bordeaux St.; $9,000 res., 898 Bordeaux St.

P. Houle, Cote St. Paul, four res., $60,000 Victoria St.

F. Neyrinck, 802 De Gaspe St., $20,500 alt., bldg., 227 Peel St.

M. Pelletier, Christope Colomb St., $8,000 extn. bldg., Mt. Royal & Chambord; also on bank, Vinet & Notre Dame.

Phillip Lahee & Co., 20 St. Nicholas St., $125,000 add. bldg., Craig & Place D'Armes Hill.

Sayer Electric Co., 87 Bleury St., $20,000 store, St Hubert.

Ottawa, Ont.

J. N. Cherry, 50 Victoria St., $8,000 res., Grove Ave.; $5,000 res., Sunnyside Ave.; $10,000 store & garage, Beechwood Ave.; $8,000 store & apt., Sunnyside Ave.

Art. Davis, LeBreton St., $3,000 res., Melrose Ave.; $5,000 res., Glen Ave.

J. A. Davis, LeBreton, $5,000 res., 2nd Ave.

J. Ellacott, Bank & Strathcona, $8,000 res., Lakeside Ave.; $5,000 res., Wendover Ave.; $5,000 res Harvard St.

Mr. Harding, $6,400 alt. bldg., O'Connor & McLeod Sts.

E. Headly, 645 Echo Drive, $5,500 res., Grove Ave.; $5,600 res., Ossington Ave.

Mr. Hoffman, Westboro, $5,500 res., Powell Ave.

A. E. Lennox, 195-5th Ave., $5,000 res., 5th Ave.

E. G. Tressider, 58-5th Ave., $12,000 hall Gloucester St.

Outremont, Que.

Sayer Electric Co., 87 Bleury St., $15,000 cottage, Nelson St.

Owen Sound, Ont.

Mm. McMeekins, 5 Ave. E., $4,000 res., 4th. St. E.; $6,000 res., 4th St. W.

Port Credit, Ont.

A. McPherson, $33,000 school.

St. Ambroise, Que.

Gilbert & Frere, Chicoutimi, $89,000 church & sacristy, Lac St. Jean.

St. Catharines, Ont.

I. Beatty, 10 Facer St., $6,000 res., Highland Ave.

F. Crawford, Ottawa & Fitzgerald St., $6,000 res., 25 Brock St.

St. Johns, Que.

A. Beaudry & Fils, $25,000 res.

St. John, N. B.

Driscoll & Machie, 9 King Square, $14,000 remod., hospital, Waterloo St.

St. Tite, Que.

Jas Gignac, Shawinigan Falls, $37,000 college, Champlain.

Smith Falls, Ont.

John M. Fader, $4,200 res., George St.

Three Rivers, Que.

Paul E. Allard, $8,000 tenements, St. Ursule Street.

Eug. Bedard, $6,000 three tenements, St. Ursule St.; $12,000 four t'ments., St. Cecile St.

Emile Bettez, $7,500 three t'ments, La. Verendry.

Henri Guilbert, 327 Laviolette St., $7,000 two t'ments., St. Paul St.; $6,000 three t'ments, st Ursule St.; $5,000 two t'ments, St. Ursule St.; $5,000 two t'ments, 116 St. Ursule St.; $5,000 two t'ments, St. Ursule St.; $8,000 t'ments, St. Angele; $5,000 two t'ments, St. Angele St.; $5,000 two t'ments, St. Ursule St.; $5,000 two t'ments, St. Ursule St.; $5,000 two t'ments St. Angele St.

Eug. Ouelette, 225 Chamflour St., $10,000 two t'ments St. Denis St.; $7,000 res., St. Oliver St.

Toronto, Ont.

W. J. Bowen, 60 Gilbert Ave., res., Winnette Ave.; $6,500 1 pr. res., 90-2 Day Ave.; $5,500 res., 131 Caledonia Rd.

J. H. Harris, 683 St. Clair W., $9,000 res., Dunvegan Rd.

Moss & Stocks, 1145 Yonge St., $60,000 church, Willard Ave.

Salisbury Electric Co. Ltd., 112 King W., $75,000 church, Bloor St.

NOTICE TO
Professional Engineers

The first general meeting of the Association of Professional Engineers of the Province of Ontario will be held at 96 King Street West, Toronto, at 7.30 p.m. on Monday, 8th January, 1923, for the purpose of electing a President, Vice-President, and Councillors, and for the transaction of general business. A register of the names of all members, elected up to 7th December, 1922, may be seen at the office of the Registrar.

On behalf of the Provisional Council of the Association.

R. B. Wolsey, Secretary

Qualified Professional Engineers are invited to make application for registration. A copy of the Professional Engineers Act, 1922, and other particulars will be sent on request.

DON'T TAKE CHANCES

Use MacLean Building Reports and secure accurate advance information on every building and engineering contract in your territory.

The reports are issued daily and reach subscribers in ample time to bid on the work or submit prices for the machinery, equipment, materials or supplies required.

Subscriptions may be placed for any one city, portion of a Province or more than one Province. Rates range from **$25.00** yearly for the smallest cities to **$500.00** yearly for the entire Dominion.

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Retail Marketing Tips

Washing Machines

—That will make you money

Start the Year 1923 Right

"SELL IN THE HOME"

There are a number of stores selling washing machines at the rate of one hundred and fifty a year.

That's three a week!

One machine every other day!

"How do you do it"? I asked one of the dealers.

"Intensive Cultivation" he replied. "I map out a definite field—not too large—and I cultivate it as carefully as I know how. I think many of our dealers make a mistake here."

"Will you outline your general plan?" I asked.

"Willingly! It's very simple—it's logical, that's all:—

(1) I prepare a hand-picked mailing list of 100 prospects, including my best customers.

(2) I notify them that on a certain date I shall give a demonstration in my store—the demonstration to be in charge of a woman.

(3) The day before the demonstration I either call these prospects on the telephone—or have an assistant do it—simply as a reminder. Incidentally, this frequently gives me a line on the prospect's attitude of mind.

(4) During the demonstration I have two main thoughts in mind:

(a) Sell the machine, or
(b) Arrange for a home demonstration.

(5) Immediately following the demonstration I begin my intensive work. Every prospect is seen in her home. A card record is kept of each interview.

(6) A month later, if I can make the rounds, I see my prospects again. I never let more than two months elapse.

(7) When I sell a machine, another new prospect is added, so that I always keep 100 on my list.

(8) Though my main purpose in this campaign is to sell washing machines, I incidentally sell many other electrical appliances without any extra effort."

"You consider it necessary to get right into the homes of your customers in order to get best results?" I inquired.

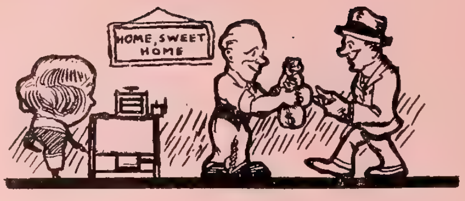
"Without the slightest question" replied this dealer. "My slogan is 'Sell in the Home.' No other form of effort the dealer can make will be nearly as effective."

Sales Are Closed at Demonstrations

If the Man of the House Had to do the Washing——

By F. S. BABCOCK

At Toronto Contractor-Dealer Convention



If possible close the sale during demonstration

I have no volume of statistics on selling electric washers—just a few ideas. They are not all original but there are some that **you** may absorb and incorporate into individual businesses. With today's high pressure of business methods and high priced merchandise it is easier to sell washing machines than ever before. It is being done over the length and breadth of the land and money is being made by the contractor-dealer.

It does not matter whether it is wiring, stores, vacuum cleaners, fixtures or washing machine, it is the profit you make on what you sell by which you judge what success you are having. Therefore one of the first items in the better selling of washing machines is the choosing of the washer you will sell. There are many angles to consider, (1) It it a long established line? (2) Is it well advertised? (3) Is it efficient? (4) Is it durable? (5) Is it convenient? (6) Is it pleasing to the eye, and will it create business itself? (7) Is the margin sufficient to warrant an effort being put into the sale of the particular washer you may be considering? (8) Is the sales resistance high? Get sold, allow someone to sell **you** some washer. Take each item up separately.

Keep Your Stock Clean

Then the care of your stock—the washing machine in your show room should be cleaned and dusted. Especially is this so of the glass tank for special demonstration. These washers are supplied at considerable cost by the several manufacturers and if kept clean they are a distinct asset both to the manufacturer and the dealer. If allowed to become dirty inside and out they are, by the same token, a very distinct liability. It is a pleasure to go into a shop and find a demonstrating machine clean and tidy. I know I have a good dealer there for he values the special tank and is cashing in on it. Keep your washing machine clear of other merchandise so that when a customer for lamps or fuses comes in you can suggest her looking at your favorite washing machine.

Never suggest her **buying** a washer. Immediately this is done you have built up a wall of resistance that will take a very great amount of tact to remove.

These casual customers are sometimes developed into the best mediums for putting your message across. Be nice to them, give them circulars, etc., and look upon them as a crop to be gathered in the future.

Interest Friends of Your Customer

In regard to getting prospects, I would suggest that you do your utmost to get the friends of any customer into her house to see a demonstration. Then is your chance to pave the way for many more sales. Of course, there must be no loophole for any mishaps in this demonstration; have everything ready so there can be no mistakes. House to house canvassing is a good way to get prospects, but it is easier to create them from those already sold.

It is, of course, well known to you that most sales are closed at the demonstrations. This is the easiest time to do it and always arrange proceedings with that idea in mind.

The competitive demonstration is something that is not generally good business. It may happen sometimes that the customer says she is not quite satisfied with the machine she has—then, of course, it is up to you to go in and win.

A Word About "Service"

I want to say a word about service. This is a very important part of the business of selling electric washing machines. It pays to call around a month after you have placed a machine to see how it is working. You can train salesmen to do a little servicing in this way. That sort of procedure shows the customer that you are really interested in the machine, and makes her boost for you and your machine.

No Mention of Price

In the actual sales argument the question of price should have no consideration. Show the woman what the washer will do for her, how many more leisure hours it will give her, what additional happiness it will mean in the home. Get the women to pity themselves—show them how hard worked they are with the old rub-board. There is one little saying that is very effective "If a man had to do the washing, no home would be without an electric washer."

The way to sell people who do not do their own work is to show them that the machine is a good investment. When an actual saving is demonstrated to them, and they see how wasteful of money and energy the old style hand washing is, they are as easy to sell as the women who does her own washing.

Sell on Instalment Plan

I favor a 30 or 90 day instalment plan as the best way of selling washers. The whole thing is a question of salesmanship. In the same way, it is often possible to sell a machine, with the privilege of using it for only one washing, instead of the long free trials advocated by some. Washing machines are a line that pay the man who puts brains and energy into selling them.

Get the neighbors
to come in.

—and still the demand increases

SUNNYSUDS

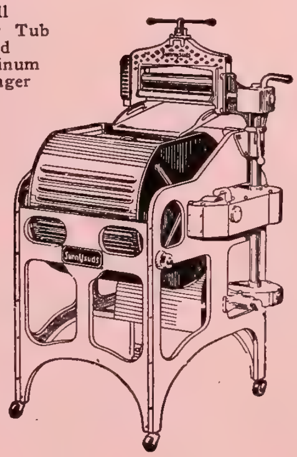
ELECTRIC WASHER & WRINGER

Is Piling Up Tremendous Profits For Electrical Dealers Everywhere

THE instantaneous success enjoyed by the Sunnysuds Electric Washer is a tribute to the manner in which it supplied the national demand for an efficient, all-metal cabinet washer, **moderately priced.** Sales immediately jumped and the dealers who took advantage of the opportunity reaped tremendous profits. That was to be expected.

But the fact that these sales have steadily increased beyond our most sanguine hopes tells better than words of the satisfaction the Sunnysuds Washer continues to give under all conditions. This washer, because of its many desirable features and its low price, recognizes no sales competition.

Perhaps your territory is open for a Sunnysuds agency. If so, you are in line for some big business. Write us today.



All Copper Tub and Aluminum Wringer

NO WONDER IT SELLS

$150

WINNIPEG AND WEST $165.00

COMPLETE

WRITE FOR PARTICULARS TODAY

Onward Manufacturing Company

Kitchener, Ontario

A tremendous number of BLUEBIRDS will be sold next year

Are you laying your plans to cash in on these large profits?

"COLONIAL MAID" WASHES BETTER

BlueBird
ELECTRIC CLOTHES WASHER

The women of Canada understand; the drudgery of old time wash day must go.

Selling Bluebird in your community you present the only perfect solution to washday problems.

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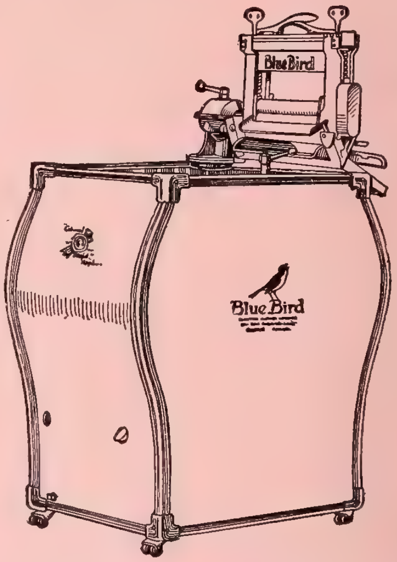

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The following Books are Offered Subject to Previous Sale:

A Laboratory Manual of Alternating Currents, by John H. Morecroft, E.C. Published in 1912 by Renouf Publishing Company. 248 pages, illustrated. Price $1.00.

Baudot Printing Telegraph System, by H. W. Pendry. Published in 1913 by Whittaker & Company. 144 pages, illustrated. Price $1.50.

Direct-Acting Steam Pumps, by Frank F. Nickel.. Published in 1915 by McGraw-Hill Book Company. 258 pages, illustrated. Price $2.00

Electric Railway, by A. Morris Buck, M.E. Published in 1915 by McGraw-Hill Book Company, Inc. 390 pages, illustrated. Price $2.50.

"Engineering Electricity," by Ralph G. Hudson, S.B., 190 pages illustrated. Published in 1920 by the John Wiley & Sons, Incorporated. Price $2.00.

Handbook of Machine Shop Electricity, by C. E. Clewell. Published in 1916 by McGraw-Hill Book Company. 461 pages, illustrated. Price $2.50.

Practical Electric Illumination, by Terrell Croft. First edition, published in 1917 by the McGraw-Hill Book Co. 225 pages, illustrated. Price $1.50.

Principles of Alternating Current Machinery, by Ralph R. Lawrence. Published in 1916 by McGraw-Hill Book Company. 614 pages, illustrated. Price $3.50.

Principles of Electrical Design—D.C. and A.C. Generators, by Alfred Still. Published in 1916 by McGraw-Hill Book Co 365 pages, illustrated. Price $2.00.

"Radio Phone Receiving." A practical book for everybody. Written by nine specialists. Recently published by D. Van Nostrand Company, 179 pages. Price $1.50.

Radiodynamics—The Wireless Control of Torpedoes and Other Mechanisms, by B. F. Miessner. Published in 1916 by D. Van Nostrand Company. 206 pages, 112 illustrations. Price. $1.50.

Telegraph Practice, a Study of Comparative Method, by John Lee, M.A. Published in 1917 by Longmans-Greene & Co. 102 pages. Price 75c.

Telegraphy—A Detailed Exposition of the Telegraph System of the British Post Office, by T. E. Herbert, A.M. Inst. E.E. Third edition. Published in 1916 by Whittaker & Company. 985 pages, 630 illustrations. Price $1.50.

"Theory and Calculation of Transient Electric Phenomena and Oscillations," by Charles Proteus Steinmetz. Third edition, revised and enlarged. Published in 1920 by McGraw-Hill Book Co., Incorporated. 696 pages, illustrated. Price $6.00.

"Testing of Electrical Machinery," for non-electrical students, by J. H. Morecroft. Fourth edition, revised and enlarged. Published by D. Van Nostrand Company, 1921. 220 pages, 111 illustrations. Price $3.00.

The Dynamo (2 volume), by Hawkins & Wallis. Published in 1909 by Whittaker & Company. Price $3.00.

The School of Practical Electricity (Electrician's Course in 2 volumes. Volume 1. Published by Electroforce Publishing Company, Milwaukee, Wis. 410 pages, illustrated. Price- $3.00

The Practical Railway Spiral, by L. C. Jordan, C.E. Published in 1913 by Van Nostrand Company. 155 pages. Price 50c.

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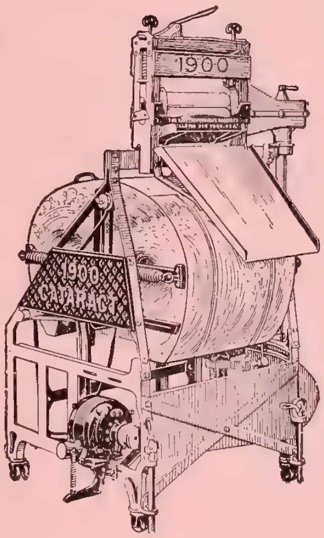

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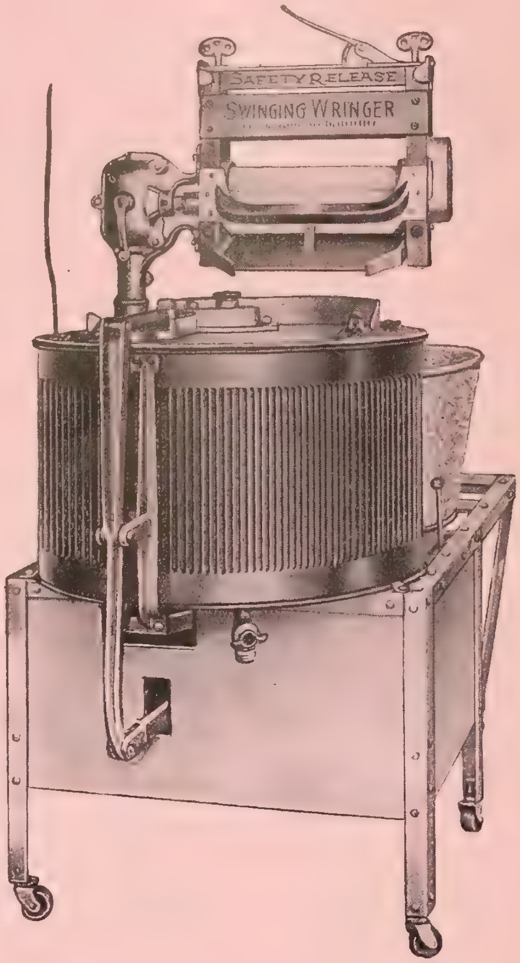

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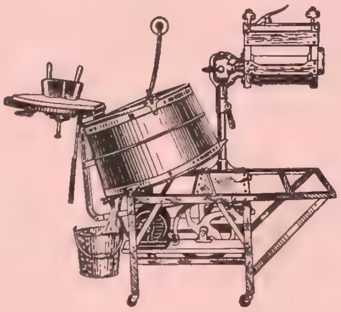

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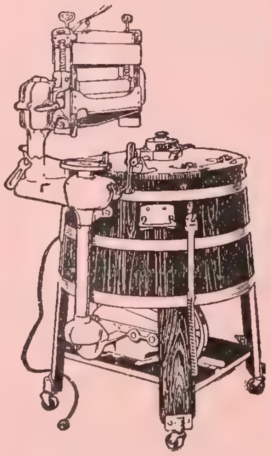

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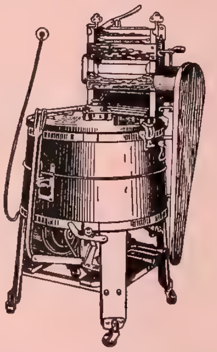

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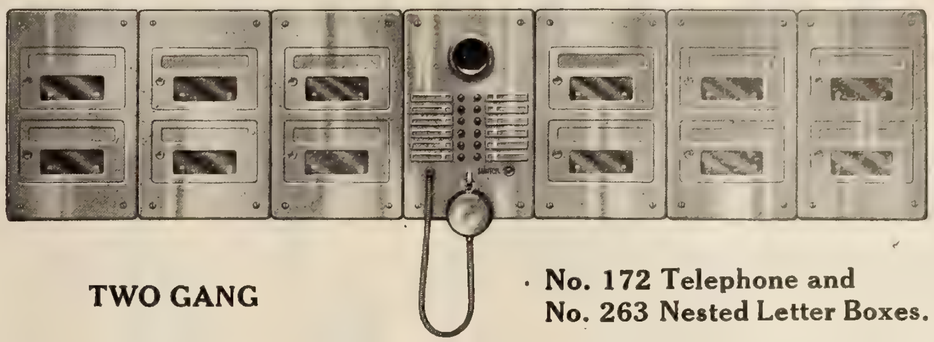

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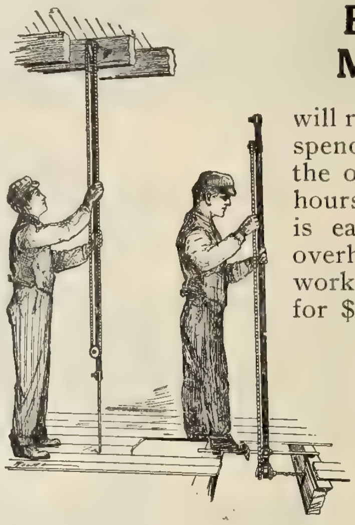

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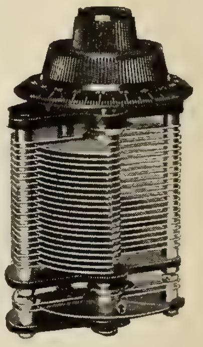

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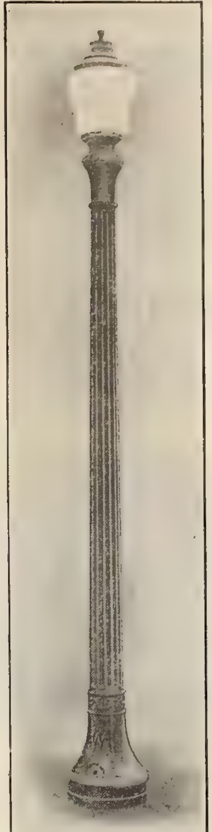

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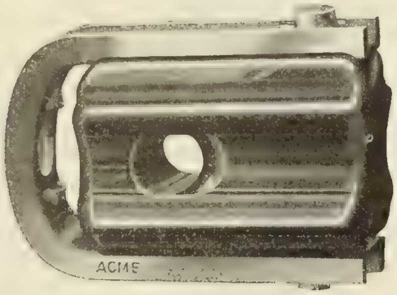

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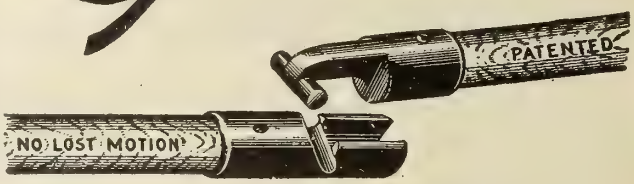

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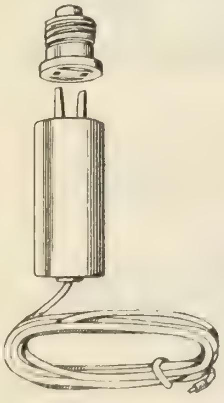

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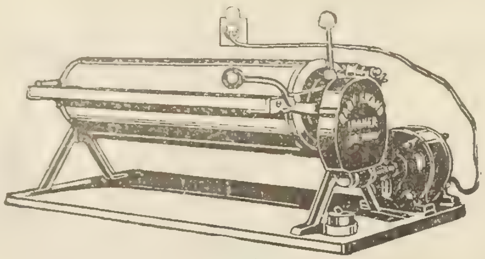

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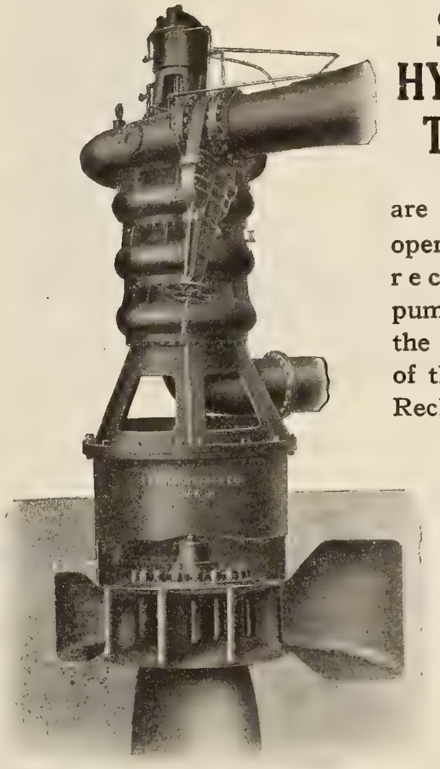

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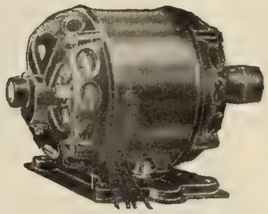

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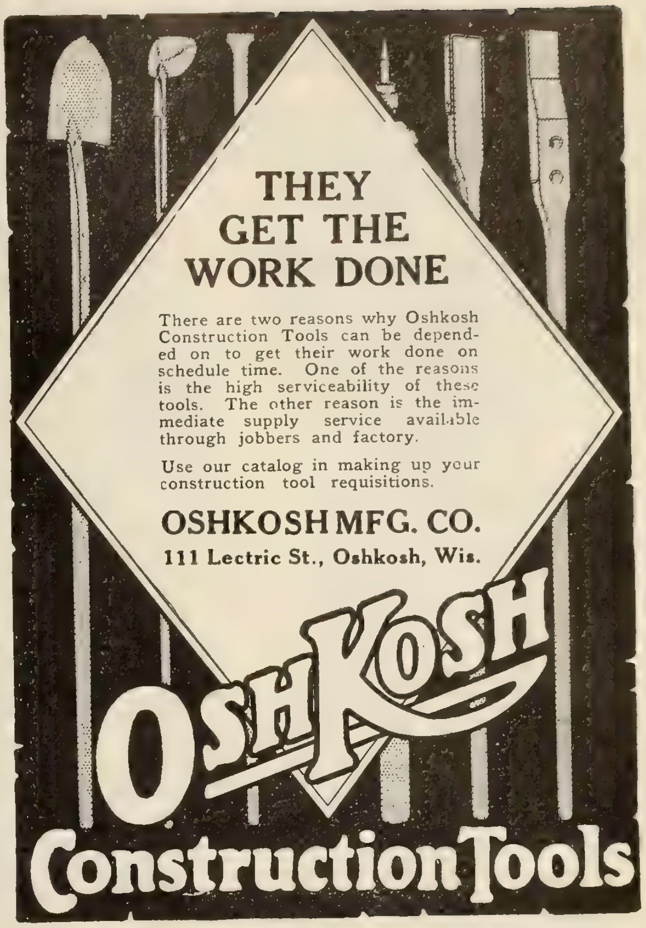

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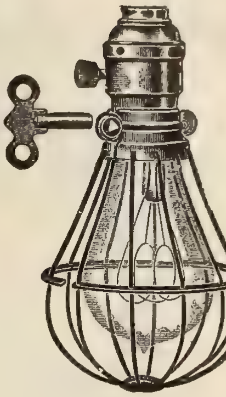

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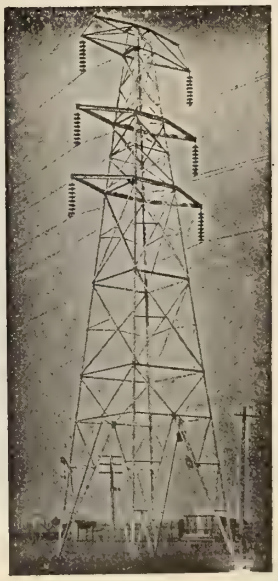

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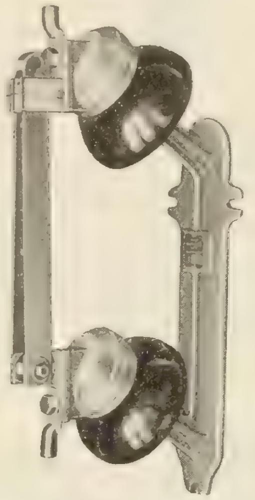

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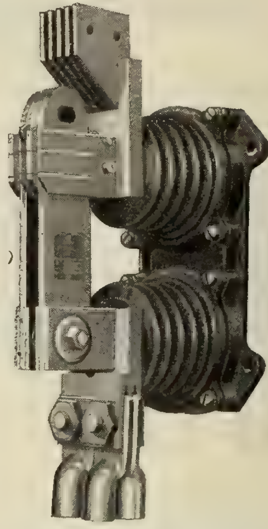

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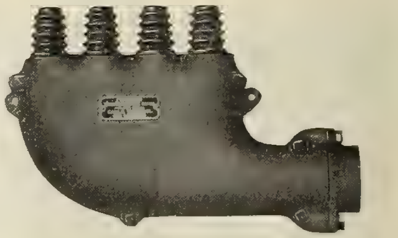
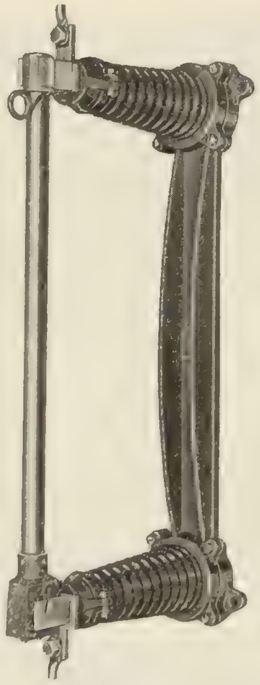
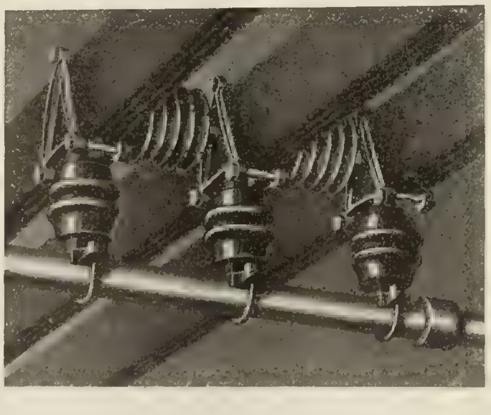


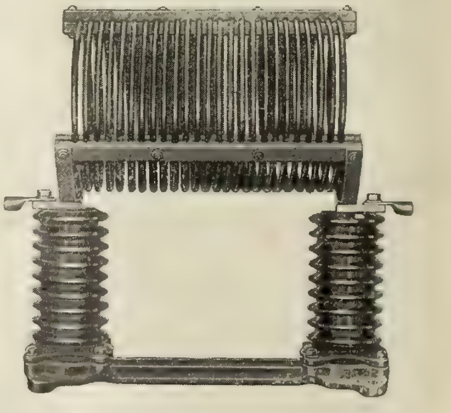
Westinghouse Split Pothead Type D



33,000 V. Type "H" Expulsion Fuse Block



Type "H" Bus Bar Supports



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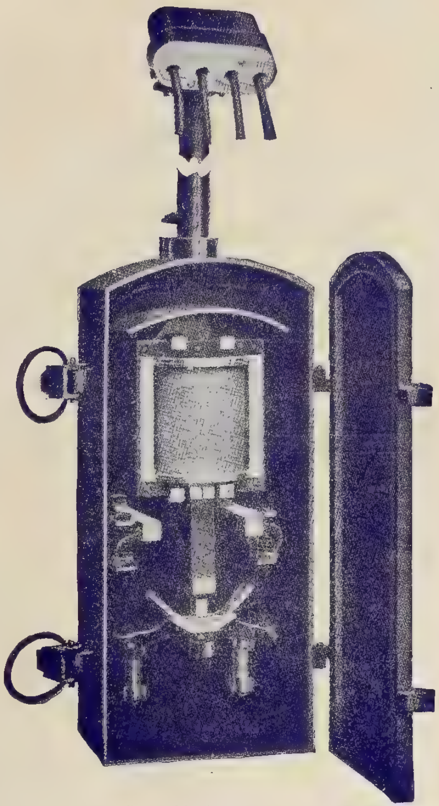

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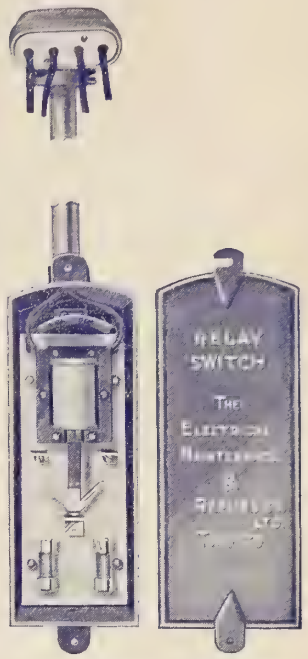

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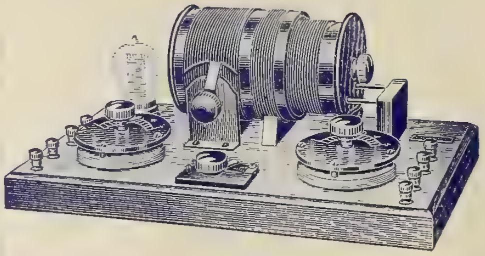

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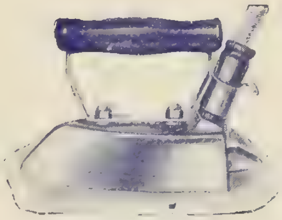

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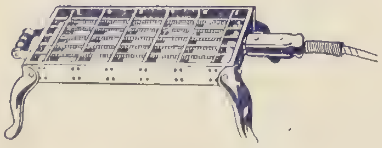

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